

WORLD CLASS 3000 OXYGEN ANALYZER (CENELEC) WITH IFT 3000 INTELLIGENT FIELD TRANSMITTER (CENELEC)

Instruction Bulletin IB-106-300NFX Rev. 4.1

<p>World Class 3000 Probe</p> <p>Part No. _____</p> <p>Serial No. _____</p> <p>Order No. _____</p>	<p>HPS 3000</p> <p>Part No. _____</p> <p>Serial No. _____</p> <p>Order No. _____</p>
<p>IFT 3000</p> <p>Part No. _____</p> <p>Serial No. _____</p> <p>Order No. _____</p>	<p>MPS 3000</p> <p>Part No. _____</p> <p>Serial No. _____</p> <p>Order No. _____</p>

NOTICE: The equipment described in this
Instruction Bulletin is manufactured by:
Rosemount Ireland
151 Shannon Industrial Estate
Co. Clare
Ireland

ROSEMOUNT® ANALYTICAL

FISHER-ROSEMOUNT™ Managing The Process Better.™

DEO 05867
14/12/93

1

DEO 05932
7-4-94

2

DEO 06435
17-5-95

3

THIS DRAWING AFFECTS CENELEC CERTIFICATION.
NO REVISION ALLOWED WITHOUT CHECKING AND
APPROVAL BY THE PRODUCT ENGINEER.

INTRODUCTION: THIS SAFETY DATA SHEET APPLIES TO INTELEGENT FIELD TRANSMITTER (IFT3000), TYPE No. 1U05691. THE APPARATUS IS CERTIFIED EExd IIB T6.:
ISSeP CERTIFICATE No.
THIS APPARATUS HAS BEEN DESIGNED AND MANUFACTURED TO OPERATE SAFELY IN CERTAIN TYPES OF POTENTIALLY EXPLOSIVE ATMOSPHERES. IT IS ESSENTIAL THAT THE EQUIPMENT IS NOT TAMPERED WITH OR DAMAGED IN ANY WAY WHICH MIGHT LEAD TO A REDUCTION IN IT'S ABILITY TO OPERATE SAFELY IN SUCH POTENTIALLY EXPLOSIVE ATMOSPHERES. FOR YOUR OWN SAFETY AND THE SAFETY OF OTHERS PLEASE BRING ANY DAMAGE TO THE ATTENTION OF THE RESPONSIBLE AUTHORITY.

THIS APPARATUS HAS BEEN DESIGNED AND MANUFACTURED IN ACCORDANCE WITH EUROPEAN STANDARDS EN50014 & EN50018. INSTALLATION MAINTENANCE AND REPAIR MUST BE IN ACCORDANCE WITH THE OFFICAL "CODES OF PRACTICE ON THE INSTALATION AND MAINTAINANCE OF ELECTRICAL APPARATUS IN POTENTIALLY EXPLOSIVE ATMOSPHERES" FOR THE COUNTRY OF INSTALLATION (EXAMPLE: BS5345 IN GREAT BRITAIN). ONLY APPROPRIATLY TRAINED PERSONNEL ARE AUTHORISED TO PERFORM ANY WORK ON THIS EQUIPMENT. SUCH PERSONNEL IN ADDITION TO OPERATING TO THE ABOVE MENTIONED SAFETY STANDARDS, SHOULD TAKE NOTE OF THE FOLLOWING SAFETY ISSUES.

(1) FLAMEPROOF APPARATUS OR NON FLAMEPROOF APPARATUS.

THE ROSEMOUNT ENCODE SHEETS (PRODUCT ORDERING MATRIX) ALLOWS A CUSTOMER TO ORDER EITHER THE HAZARDOUS AREA (FLAMEPROOF) VERSION OF THE IFT3000 OR THE NON HAZARDOUS AREA VERSION. THE HAZARDOUS AREA VERSION HAS THE SYMBOL "EExd" ON THE APPARATUS NAMEPLATE. THE NON HAZARDOUS AREA VERSION DOES NOT. ENSURE THAT IF YOU HAVE RECEIVED THE NON HAZARDOUS AREA VERSION THAT YOU DO NOT INSTALL IT IN A POTENTIALLY EXPLOSIVE ENVIRONMENT.

(2) POWER DOWN PROCEDURE:

ISOLATION OF ELECTRICAL SUPPLY: THIS PIECE OF APPARATUS IS NOT ITSELF FITTED WITH A MEANS OF ELECTRICAL ISOLATION. CONSULT YOUR LOCAL CODES OF PRACTICE ON THE INSTALLATION AND MAINTAINANCE OF ELECTRICAL APPARATUS IN POTENTIALLY EXPLOSIVE ATMOSPHERES (BS5345 IN BRITAIN) FOR INSTRUCTION ON THE ISOLATION OF ELECTRICAL SUPPLY TO THE APPARATUS. FURTHER MORE THERE MUST BE "EFFECTIVE MEASURES TO PREVENT THE RESTORATION OF SUPPLY TO THE APPARATUS WHILE THE RISK OF EXPOSING UNPROTECTED LIVE CONDUCTORS TO AN EXPLOSIVE ATMOSPHERE CONTINUES": BS5345 PART 1 1989 SECTION 18.

RESTORATION OF SUPPLY FOR ELECTRICAL TESTING: "WHERE, FOR PURPOSES OF ELECTRICAL TESTING, IT IS ESSENTIAL TO RESTORE THE SUPPLY BEFORE THE APPARATUS IS RE-ASSEMBLED, THEN THIS WORK SHOULD BE UNDER A CONTROLLED PROCEDURE AND THE SPECIFIC LOCATION ASSESSED TO ENSURE THAT POTENTIALLY FLAMMABLE GAS OR VAPOUR IS ABSENT": BS5345 PART 1 1989 SECTION 23.

REMOVAL OF JUNCTION BOX COVER: DO NOT OPEN THE APPARATUS COVER WHILE THE APPARTUS IS ENERGISED. WAIT 10 MINUTES AFTER DEENERGISING BEFORE OPENING THE APPARATUS.

(3) WIRING OF THE APPARATUS: EACH APPARATUS MUST BE WIRED AS DETAILED IN THE APPLICABLE INSTRUCTION BULLETIN (USER MANUAL).

(4) INSTRUCTION BULLETINS (USER MANUAL). THE APPLICABLE INSTRUCTION BULLETIN IS: IB-106-300NFX: USED WITH IFT3000 ELECTRONICS.
THIS INSTRUCTION BULLETIN CONTAIN ESSENTIAL INFORMATION & MUST BE USED WHEN WORKING ON THE APPARATUS.

(5) CABLE GLANDS: HAWKE CABLE GLAND, TYPE ICG653 (BASEEFA CERTIFICATE : BAS No. EX 85B1258U) OR AN EQUIVALENT MUST BE USED. THIS GLAND IS A BARRIER (STOPPER) GLAND. A FEATURE OF THIS GLAND IS THAT A COMPOUND FILLED PACKING MATERIAL (PUTTY), FORMS A BARRIER BETWEEN THE INDIVIDUAL INSULATED CONDUCTORS OF THE CABLE. THIS BARRIER ACTS TO PREVENT ENTRY INTO THE CABLE OF THE PRODUCTS OF AN EXPLOSION WITHIN THE ENCLOSURE. THIS GLAND IS CERTIFIED Exd IIC.

ROSEMOUNT
Measurement
Control
Equipment

TITLE
SAFETY DATA SHEET FOR
CENELEC APPROVED IFT3000

SIZE
DWG NO 1M03296

SCALE
SHEET 1 OF 2

DRAFT
5/12/14 7/15/14

CHKD
5/12/14 1/5/15

ENGR
18/1/15

APPR

DEO 05867
13/12/93

1

DEO 05932
7-4-94

2

DEO 06435
17-5-95

3

THIS DRAWING AFFECTS CENELEC CERTIFICATION.
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APPROVAL BY THE PRODUCT ENGINEER.

(6) EXISTING WESTINGHOUSE/ROSEMOUNT SUPPLIED CABLE:

ON EARLIER INSTALLATIONS WESTINGHOUSE/ROSEMOUNT SUPPLIED A CABLE BETWEEN THE DIGITAL ELECTRONICS AND PROBE (MODEL 218). THE GLANDS ON THIS CABLE - ALTHOUGH HAWKE GLANDS CERTIFIED Exd IIC WERE NOT OF THE HAWKE BARRIER (STOPPER) GLAND, TYPE ICG653 VARIETY. THESE GLANDS MUST NOT BE USED. ROSEMOUNT CAN SUPPLY A BARRIER GLAND KIT TO REPLACE SUCH GLANDS. THE KIT (PART No. 1U03066G07), COMPRISES OF TWO BARRIER GLANDS COMPLETE WITH PUTTY, CRIMPS AND AN INSTRUCTION SHEET. PLEASE NOTE THAT YOU SHOULD USE ONLY PUTTY WHICH IS PLASTIC & CAPABLE OF BEING MIXED. YOU SHOULD NOT USE CRYSTALISED OR HARD PUTTY.

(7) CABLE ANCHORAGE

THIS APPARATUS DOES NOT INCLUDE ANY SPECIFIC MEANS FOR CABLE ANCHORAGE. THE CABLE GLANDS CHOSEN FOR THE MAINS, PROBE, AND SIGNAL CABLES MUST BE OF A TYPE WHICH SUPPLY CABLE ANCHORAGE. THE BARRIER (STOPPER) GLAND SUPPLIED BY ROSEMOUNT AS PART OF THE PROBE CABLE ASSEMBLY, WILL GIVE SUCH CABLE ANCHORAGE.

(8) UNUSED CABLE ENTRY PORTS:

ALL CABLE ENTRY PORTS WHICH ARE UNUSED ARE TO BE CLOSED OFF WITH THREADED PLUGS CERTIFIED Exd IIC. THERE SHOULD BE A MINIMUM OF 5 THREADS ENGAGED AND THE THREADS SEALED WITH THREADLOCK (LOCTITE 271 OR EQUIVALENT),

(9) NAMEPLATE (LABEL):

ENSURE THAT NAMEPLATE IS AT ALL TIMES VISIBLE. AT INSTALLATION, ALLOWANCE MUST BE MADE FOR THIS.

(10) EARTHING OF THE APPARATUS:

THE APPARATUS HAS BEEN FITTED WITH BOTH EXTERNAL AND INTERNAL EARTHING POINTS. ADEQUATE EARTH CONNECTIONS SHOULD BE MADE TO BOTH THESE POINTS.

(11) SHEET METALWORK PANELS.

THIS APPARATUS CONTAINS A NUMBER OF SHEET METALWORK PANELS FOR MOUNTING THE PRINTER CIRCUIT BOARDS. BECAUSE THESE PANELS ARE IN CLOSE PROXIMITY TO THE WALLS OF THE FLAMEPROOF ENCLOSURE, IT WAS NECESSARY TO PERFORATE THEM WITH HOLES AND SLOTS. THESE HOLES AND SLOTS PREVENT PRESSURE PILING BETWEEN THE PANELS AND THE WALLS & LID OF THE ENCLOSURE. DO NOT DO ANYTHING WHICH MIGHT OBSCURE THESE SLOTS & HOLES.

(12) LIFTING AND CARRYING.

THE IFT3000 IS A HEAVY PIECE OF APPARATUS. LIFTING AND CARRYING PROCEDURES SHOULD TAKE ACCOUNT OF THIS WEIGHT.

(13) CONNECTION TO HART OPTION.

HART IS A COMMUNICATIONS PROTOCOL WHICH ALLOWS REMOTE COMMUNICATION WITH THE IFT3000 VIA THE 4-20mA OUTPUT. BECAUSE, ON THE IFT3000, THE HART OPTION IS NOT PROTECTED BY ENERGY LIMITING BARRIERS, IT MUST NOT BE INTERFACED FROM WITHIN THE HAZARDOUS AREA. THE 4-20mA CABLES SHOULD BE ROUTED OUTSIDE THE HAZARDOUS AREA, AND THE CONNECTION MADE OUT THERE. NOTE THIS IS THE CASE EVEN WHEN USING THE INTRINSICALLY SAFE VERSION OF THE THE HANDHELD COMMUNICATOR. THE LIMITATION (ie, NO ENERGY LIMITING BARRIER) LIES IN THE IFT3000 NOT IN THE HANDHELD UNIT.

ROSEMOUNT

Instrument
Supply Ltd

TITLE SAFETY DATA SHEET FOR
CENELEC APPROVED IFT3000.

DRAWN
J. Vaneley 17/5/95
CHKD
J. Vaneley 17/5/95
ENGR
J. Vaneley 17/5/95
APPR

SCALE
SIZE
DWG NO 1 M03296
SHEET 2

DEO 05554 17-2-93	1
DEO 05856 13/12/93	2
DEO 05933 7-4-94	3

THIS DRAWING AFFECTS CENELEC CERTIFICATION.
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APPROVAL BY THE PRODUCT ENGINEER.

INTRODUCTION: THIS SAFETY DATA SHEET APPLIES TO BOTH, HEATER POWER SUPPLY 3000 (HPS3000), TYPE No. 1U05667 AND TO DIGITAL ELECTRONICS, TYPE No. 1U03083. THESE APPARATUS ARE CERTIFIED EExd IIC T6.

ISSEP CERTIFICATE No. 92C.103.1037, AND INIEX CERTIFICATE No. 87.103.578.

THESE APPARATUS HAVE BEEN DESIGNED AND MANUFACTURED TO OPERATE SAFELY IN CERTAIN TYPES OF POTENTIALLY EXPLOSIVE ATMOSPHERES. IT IS ESSENTIAL THAT THE EQUIPMENT IS NOT TAMPERED WITH OR DAMAGED IN ANY WAY WHICH MIGHT LEAD TO A REDUCTION IN IT'S ABILITY TO OPERATE SAFELY IN SUCH POTENTIALLY EXPLOSIVE ATMOSPHERES. FOR YOUR OWN SAFETY AND THE SAFETY OF OTHERS PLEASE BRING ANY DAMAGE TO THE ATTENTION OF THE RESPONSIBLE AUTHORITY.

THESE APPARATUS HAVE BEEN DESIGNED AND MANUFACTURED IN ACCORDANCE WITH EUROPEAN STANDARDS EN50014 & EN50018. INSTALLATION MAINTENANCE AND REPAIR MUST BE IN ACCORDANCE WITH THE OFFICAL "CODES OF PRACTICE ON THE INSTALATION AND MAINTAINANCE OF ELECTRICAL APPARATUS IN POTENTIALLY EXPLOSIVE ATMOSPHERES" FOR THE COUNTRY OF INSTALLATION (EXAMPLE: BS5345 IN GREAT BRITAIN). ONLY APPROPRIATLY TRAINED PERSONNEL ARE AUTHORISED TO PERFORM ANY WORK ON THIS EQUIPMENT. SUCH PERSONNEL IN ADDITION TO OPERATING TO THE ABOVE MENTIONED SAFETY STANDARDS, SHOULD TAKE NOTE OF THE FOLLOWING SAFETY ISSUES.

(1) FLAMEPROOF APPARATUS OR NON FLAMEPROOF APPARATUS.

THE ROSEMOUNT ENCODE SHEETS (PRODUCT ORDERING MATRIX) ALLOWS A CUSTOMER TO ORDER EITHER THE HAZARDOUS AREA (FLAMEPROOF) VERSION OF THE APPARATUS OR THE NON HAZARDOUS AREA VERSION. THE HAZARDOUS AREA VERSION HAS THE SYMBOL "EExd" ON THE APPARATUS NAMEPLATE. THE NON HAZARDOUS AREA VERSION DOES NOT. ENSURE THAT IF YOU HAVE RECEIVED THE NON HAZARDOUS AREA VERSION THAT YOU DO NOT INSTALL IT IN APOTENTIALLY EXPLOSIVE ENVIRONMENT.

(2) POWER DOWN PROCEDURE:

ISOLATION OF ELECTRICAL SUPPLY: THIS PIECE OF APPARATUS IS NOT ITSELF FITTED WITH A MEANS OF ELECTRICAL ISOLATION. CONSULT YOUR LOCAL CODES OF PRACTICE ON THE INSTALLATION AND MAINTAINANCE OF ELECTRICAL APPARATUS IN POTENTIALLY EXPLOSIVE ATMOSPHERES (BS5345 IN BRITAIN) FOR INSTRUCTION ON THE ISOLATION OF ELECTRICAL SUPPLY TO THE APPARATUS. FURTHER MORE THERE MUST BE "EFFECTIVE MEASURES TO PREVENT THE RESTORATION OF SUPPLY TO THE APPARATUS WHILE THE RISK OF EXPOSING UNPROTECTED LIVE CONDUCTORS TO AN EXPLOSIVE ATMOSPHERE CONTINUES":BS5345 PAPT 1 1989 SECTION 18.

RESTORATION OF SUPPLY FOR ELECTRICAL TESTING: "WHERE, FOR PURPOSES OF ELECTRICAL TESTING, IT IS ESSENTIAL TO RESTORE THE SUPPLY BEFORE THE APPARATUS IS RE-ASSEMBLED, THEN THIS WORK SHOULD BE UNDER A CONTROLLED PROCEDURE AND THE SPECIFIC LOCATION ASSESSED TO ENSURE THAT POTENTIALLY FLAMMABLE GAS OR VAPOUR IS ABSENT":BS5345 PART 1 1989 SECTION 23.

REMOVAL OF JUNCTION BOX COVER: DO NOT REMOVE THE JUNCTION BOX COVER WHILE THE APPARTUS IS ENERGISED. WAIT 10 MINUTES AFTER DEENERGISING BEFORE OPENING THE APPARATUS.

(3) WIRING OF THE APPARATUS: EACH APPARATUS MUST BE WIRED AS DETAILED IN THE APPLICABLE INSTRUCTION BULLETIN (USER MANUAL).

(4) INSTRUCTION BULLETINS (USER MANUAL). THE APPLICABLE INSTRUCTION BULLETINS ARE:
IB-106-300NEX: "EXCHANGE PROBE" CONFIGURATION & "FULLY CENELEC" CONFIGURATION.
IB-106-300NFX: USED WITH IFT3000 ELECTRONICS.
IB-106-300NCX: USED WITH CRE3000 ELECTRONICS.
THESE INSTRUCTION BULLETINS CONTAIN ESSENTIAL INFORMATION & MUST BE USED WHEN WORKING ON THE APPARATUS.

(5) CABLE GLANDS: HAWKE CABLE GLAND, TYPE ICG653 (BASEEFA CERTIFICATE : BAS No. EX 85B1258U) OR AN EQUIVALENT MUST BE USED. THIS GLAND IS A BARRIER (STOPPER) GLAND. A FEATURE OF THIS GLAND IS THAT A COMPOUND FILLED PACKING MATERIAL (PUTTY), FORMS A BARRIER BETWEEN THE INDIVIDUAL INSULATED CONDUCTORS OF THE CABLE. THIS BARRIER ACTS TO PREVENT ENTRY INTO THE CABLE OF THE PRODUCTS OF AN EXPLOSION WITHIN THE ENCLOSURE. THIS GLAND IS CERTIFIED Exd IIC.

DRG 11/11/94	CHKD 07/11/94	ENGR 07/11/94	APPR 07/11/94
ROSEMOUNT SAFETY DATA SHEET FOR CENELEC APPROVED HPS3000 & CENELEC APPROVED DIG. ELECTRONICS SIZE DWG NO 1M03243 SHEET 1 OF 2			

DEO 05554 17-2-93	1
DEO 05856 13/12/93	2
DEO 05933 7-4-94	3
<p>THIS DRAWING AFFECTS CENELEC CERTIFICATION. NO REVISION ALLOWED WITHOUT CHECKING AND APPROVAL BY THE PRODUCT ENGINEER.</p>	
DRAFT 13/12/93 7/4/94 CHKD 01/01/94 ENGR 01/01/94 APPR 01/01/94	ROSEMOUNT SAFETY DATA SHEET FOR CENELEC APPROVED HPS3000 & CENELEC APPROVED DIG. ELECTRONICS TITLE CENELEC APPROVED HPS3000 & CENELEC APPROVED DIG. ELECTRONICS SIZE DWG NO 1M03243 SCALE SHEET 2

(6) EXISTING WESTINGHOUSE/ROSEMOUNT SUPPLIED CABLE:

ON EARLIER INSTALLATIONS WESTINGHOUSE/ROSEMOUNT SUPPLIED A CABLE BETWEEN THE DIGITAL ELECTRONICS AND PROBE (MODEL 218). THE GLANDS ON THIS CABLE - ALTHOUGH HAWKE GLANDS CERTIFIED Exd IIC WERE NOT OF THE HAWKE BARRIER (STOPPER) GLAND, TYPE ICG653 VARIETY. THESE GLANDS MUST NOT BE USED. ROSEMOUNT CAN SUPPLY A BARRIER GLAND KIT TO REPLACE SUCH GLANDS. THE KIT (PART No. 1U03066G07), COMPRISES OF TWO BARRIER GLANDS COMPLETE WITH PUTTY, CRIMPS AND AN INSTRUCTION SHEET. PLEASE NOTE THAT YOU SHOULD USE ONLY PUTTY WHICH IS PLASTIC & CAPABLE OF BEING MIXED. YOU SHOULD NOT USE CRYSTALISED OR HARD PUTTY.

(7) CABLE ANCHORAGE.

NEITHER THE HPS3000 NOR THE DIGITAL ELECTRONICS INCLUDE ANY SPECIFIC MEANS FOR CABLE ANCHORAGE. THE CABLE GLANDS CHOSEN FOR THE MAINS, PROBE, AND SIGNAL CABLES MUST BE OF A TYPE WHICH SUPPLY CABLE ANCHORAGE. THE BARRIER (STOPPER) GLAND SUPPLIED BY ROSEMOUNT AS PART OF THE PROBE CABLE ASSEMBLY, WILL GIVE SUCH CABLE ANCHORAGE.

(8) UNUSED CABLE ENTRY PORTS:

ALL CABLE ENTRY PORTS WHICH ARE UNUSED ARE TO BE CLOSED OFF WITH THREADED PLUGS CERTIFIED Exd IIC. THERE SHOULD BE A MINIMUM OF 5 THREADS ENGAGED AND THE THREADS SEALED WITH THREADLOCK (LOCTITE 271 OR EQUIVALENT).

(9) NAMEPLATE (LABEL):

ENSURE THAT NAMEPLATE IS AT ALL TIMES VISIBLE. AT INSTALLATION, ALLOWANCE MUST BE MADE FOR THIS.

(10) EARTHING OF THE APPARATUS:

THE APPARATUS HAS BEEN FITTED WITH BOTH EXTERNAL AND INTERNAL EARTHING POINTS. ADEQUATE EARTH CONNECTIONS SHOULD BE MADE TO BOTH THESE POINTS.

DEO	05553	1
	16-2-93	
DEO	05934	2
	4-2-94	

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DRTM	CHD	ENR	APPR	SCALE	SIZE	TITLE
	01/01/94	01/01/94	01/01/94			ROSEMOUNT
						SAFETY DATA SHEET FOR
						CENELEC APPROVED WC3000 PROBE
						DWG NO1 M03226
						SHEET 1 OF 6

INTRODUCTION: THIS SAFETY DATA SHEET APPLIES TO WC3000 INSITU OXYGEN ANALYSER (PROBE), TYPE No. 1U05680. THIS OXYGEN ANALYSER IS CERTIFIED EExd IIB 370 (T1) : ISSeP CERTIFICATE No. 93C.103.1067.

THIS PIECE OF EQUIPMENT HAS BEEN DESIGNED AND MANUFACTURED TO OPERATE SAFELY IN CERTAIN TYPES OF POTENTIALLY EXPLOSIVE ATMOSPHERES. IT IS ESSENTIAL THAT THE EQUIPMENT IS NOT TAMPERED WITH OR DAMAGED IN ANY WAY WHICH MIGHT LEAD TO A REDUCTION IN IT'S ABILITY TO OPERATE SAFELY IN SUCH POTENTIALLY EXPLOSIVE ATMOSPHERES. FOR YOUR OWN SAFETY AND THE SAFETY OF OTHERS PLEASE BRING ANY DAMAGE TO THE ATTENTION OF THE RESPONSIBLE AUTHORITY.

THIS PIECE OF EQUIPMENT HAS BEEN DESIGNED AND MANUFACTURED IN ACCORDANCE WITH EUROPEAN STANDARDS EN50014 & EN50018. INSTALLATION MAINTENANCE AND REPAIR MUST BE IN ACCORDANCE WITH THE OFFICAL "CODES OF PRACTICE ON THE INSTALATION AND MAINTAINANCE OF ELECTRICAL APPARATUS IN POTENTIALLY EXPLOSIVE ATMOSPHERES" FOR THE COUNTRY OF INSTALLATION (EXAMPLE: BS5345 IN GREAT BRITAIN). ONLY APPROPRIATLY TRAINED PERSONNEL ARE AUTHORISED TO PERFORM ANY WORK ON THIS EQUIPMENT. SUCH PERSONNEL IN ADDITION TO OPERATING TO THE ABOVE MENTIONED SAFETY STANDARDS, SHOULD TAKE NOTE OF THE FOLLOWING SAFETY ISSUES.

NOTE: THROUGHOUT THIS DATA SHEET, CONTINUOUS REFERENCE WILL BE MADE TO FIGURE 1.

(1) POWER DOWN PROCEDURE:

ISOLATION OF ELECTRICAL SUPPLY: THIS PIECE OF APPARATUS IS NOT ITSELF FITTED WITH A MEANS OF ELECTRICAL ISOLATION. CONSULT YOUR LOCAL CODES OF PRACTICE ON THE INSTALLATION AND MAINTAINANCE OF ELECTRICAL APPARATUS IN POTENTIALLY EXPLOSIVE ATMOSPHERES (BS5345 IN BRITAIN) FOR INSTRUCTION ON THE ISOLATION OF ELECTRICAL SUPPLY TO THE APPARATUS. FURTHER MORE THERE MUST BE "EFFECTIVE MEASURES TO PREVENT THE RESTORATION OF SUPPLY TO THE APPARATUS WHILE THE RISK OF EXPOSING UNPROTECTED LIVE CONDUCTORS TO AN EXPLOSIVE ATMOSPHERE CONTINUES": BS5345 PART 1 1989 SECTION 18.

RESTORATION OF SUPPLY FOR ELECTRICAL TESTING: "WHERE, FOR PURPOSES OF ELECTRICAL TESTING, IT IS ESSENTIAL TO RESTORE THE SUPPLY BEFORE THE APPARATUS IS RE-ASSEMBLED, THEN THIS WORK SHOULD BE UNDER A CONTROLLED PROCEDURE AND THE SPECIFIC LOCATION ASSESSED TO ENSURE THAT POTENTIALLY FLAMMABLE GAS OR VAPOUR IS ABSENT": BS5345 PART 1 1989 SECTION 23.

REMOVAL OF JUNCTION BOX COVER: DO NOT REMOVE THE JUNCTION BOX COVER (ITEM 2) WHILE THE APPARATUS IS ENERGISED. DO NOT REMOVE THE JUNCTION BOX COVER WHEN A POTENTIALLY EXPLOSIVE ATMOSPHERE IS PRESENT. REMEMBER (ALTHOUGH THE UNIT HAS BEEN POWERED DOWN AND THE PROBE HEATER HAS BEEN ALLOWED TO COOL DOWN), THE TEMPERATURE ON THE INTERIOR OF THE PROBE TUBE (ITEM 1) WILL BE SIMILAR TO THE TEMPERATURE OF THE EXHAUST GAS. IF THERE IS A POTENTIALLY EXPLOSIVE ATMOSPHERE IN THE REGION OF THE JUNCTION BOX (ITEM 3), THIS GAS WILL, ON THE REMOVAL OF THE JUNCTION BOX COVER BE EXPOSED TO THE HOT SURFACE OF THE TUBE INTERIOR (ITEM 1).

(2) THREADED JOINTS:

THE JOINT BETWEEN THE JUNCTION BOX (ITEM 3) AND THE JUNCTION BOX LID (ITEM 2) IS A THREADED JOINT. SO ALSO IS THE JOINT BETWEEN THE PROBE END FLANGE (ITEM 4) AND THE FLAME ARRESTOR HUB (ITEM 5). BOTH THESE JOINTS ARE SECURED BY SET SCREWS (ITEMS 6 & 7). BEFORE REMOVING THE JUNCTION BOX COVER (ITEM 2) OR THE FLAME ARRESTOR HUB (ITEM 5), FULLY REMOVE THE SET-SCREWS (ITEMS 6 & 7) FROM THEIR TAPPED HOLES. FAILURE TO DO THIS COULD RESULT IN DAMAGE TO THE THREADS OF THE JUNCTION BOX (ITEM 3) AND THE PROBE END FLANGE (ITEM 4) BY THE SET-SCREWS BEING DRAWN OVER THE THREADS. REMEMBER WHEN REFITTING THE JUNCTION BOX LID AND THE FLAME ARRESTOR HUB TO LOCK IN PLACE WITH THE SETSCREWS. THE MATERIAL OF THE JUNCTION BOX AND THE JUNCTION BOX LID IS ALUMINIUM ALLOY. SPECIAL CARE SHOULD BE TAKEN TO AVOID DAMAGE TO THE THREADS. NOTE THAT ROSEMOUNT SUPPLY ALLEN KEYS FOR REMOVAL & REPLACEMENT OF THE SETSCREWS.

DED	05553	1
	16-2-93	
DED	05934	2
	4-2-94	

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(3) CORROSION AND ABRASION:

● PROBE TUBE (ITEM 1): TO PROVIDE RESISTANCE AGAINST THE EFFECTS OF CORROSION AND ABRASION, THE PROBE TUBE HAS BEEN MANUFACTURED FROM 4.75mm WALL, 316 SERIES STAINLESS STEEL. FOR THE MAJORITY OF APPLICATIONS THE RESISTANCE AFFORDED BY THIS PROBE TUBE AGAINST CORROSION AND ABRASION IS MORE THAN ADEQUATE. FOR APPLICATIONS IN WHICH THE EFFECTS OF CORROSION OR ABRASION ARE SIGNIFICANT, ROSEMOUNT CAN SUPPLY AN ABRASIVE SHIELD.

● FLAME ARRESTOR HUB (ITEM 5): THE FLAME ARRESTOR HUB HAS BEEN MANUFACTURED FROM 316 SERIES STAINLESS STEEL. AT IT'S THINNEST SECTION (BETWEEN THE O/D OF THE HUB AND THE MAXIMUM MAJOR DIAMETER OF THE M70 X 2 X 6H THREAD: SEE FIGURE 2). THE MINIMUM MATERIAL THICKNESS IS 2.75mm. FOR THE MAJORITY OF APPLICATIONS THE PROTECTION AFFORDED BY THIS ARRANGEMENT AGAINST THE EFFECTS OF CORROSION AND ABRASION IS MORE THAN ADEQUATE. FOR APPLICATIONS IN WHICH THE EFFECTS OF CORROSION OR ABRASION ARE SIGNIFICANT, ROSEMOUNT CAN SUPPLY AN ABRASIVE SHIELD.

DRAFT		DATE		5/11/15/14/14	
CHD	CHD	CHD	CHD	CHD	CHD
ENGR	ENGR	ENGR	ENGR	ENGR	ENGR
APPR	APPR	APPR	APPR	APPR	APPR
TITLE		ROSEMOUNT			
SAFETY DATA SHEET FOR		CENELEC APPROVED WC3000 PROBE			
SIZE	DWG NO	1M03226			
SCALE	SHEET	2			

DED 05553 16-2-93	1
DED 05934 4-2-94	2
<p>THIS DRAWING AFFECTS CENELEC CERTIFICATION. NO REVISION ALLOWED WITHOUT CHECKING AND APPROVAL BY THE PRODUCT ENGINEER.</p>	
DRAFT J. H. H. / K. H. H. CHD ... EGR ... APPR ...	ROSEMOUNT SAFETY DATA SHEET FOR CENELEC APPROVED WC3000 PROBE SCALE 1:1 SHEET 3

(4) BREATHING DEVICES: EACH OF THE THREE BULKHEAD UNION FITTINGS (ITEM 8) HAS BEEN FITTED WITH A CAPILLARY ARRAY, (BREATHING DEVICE): SEE FIGURE 3. WHEN FITTING TUBING, (0.25 INCH O/D), TO THE REFERENCE AIR AND CALIBRATION GAS PORTS, TAKE CARE NOT TO DAMAGE THE BREATHING DEVICES. THE VENT PORT SHOULD BE LEFT CLEAR OF OBSTRUCTIONS.

(5) WIRING DIAGRAM: THE PROBE SHOULD BE WIRED AS SHOWN IN FIGURE 4.

(6) CUSTOMER REPAIRS: THE FOLLOWING REPAIRS ARE THE ONLY REPAIRS WHICH THE CUSTOMER IS ALLOWED TO MAKE:

- REPLACEMENT OF ZIRCONIUM CELL (ITEM 9) - CELL REPLACEMENT KIT -.
- REPLACEMENT OF STRUT ASSEMBLY (ITEM 10). THE RESISTANCE OF THE REPLACEMENT HEATER MUST BE 11 OHMS OR GREATER.
- REPLACEMENT OF CONTACT AND THERMOCOUPLE ASSEMBLY (ITEM 11).
- REPLACEMENT OF FLAME ARRESTOR HUB ASSEMBLY (ITEM 5).
- REPLACEMENT OF VEE DEFLECTOR ASSEMBLY (ITEM 12).
- REPLACEMENT OF CERAMIC DIFFUSION ELEMENT (ITEM 13) - DIFFUSION ELEMENT REPLACEMENT KIT -. TAKE CARE NOT TO DAMAGE THE FLAME ARRESTOR (ITEM 18) ITSELF OR THE FLAME ARRESTOR HUB.

WIRING DIAGRAM

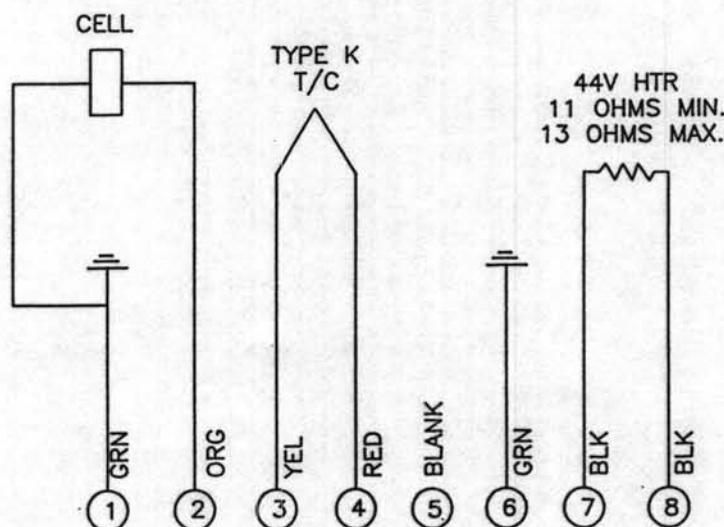


FIGURE 4

05553	1
16-2-93	
05934	2
4-2-94	

THIS DRAWING AFFECTS CENELEC CERTIFICATION.
NO REVISION ALLOWED WITHOUT CHECKING AND
APPROVAL BY THE PRODUCT ENGINEER.

(7) CABLE ENTRY:

CABLE ENTRY TO THIS APPARATUS IS VIA THE 1/2" NPT CABLE ENTRY PORT PROVIDED. THE CABLE ENTRY MUST MAINTAIN THE FLAMEPROOF PROPERTIES OF THE ENCLOSURE. ROSEMOUNT CAN SUPPLY A CABLE WHICH IS TERMINATED WITH A BARRIER (STOPPER) GLAND. A FEATURE OF THIS GLAND IS THAT A COMPOUND FILLED PACKING MATERIAL (PUTTY), FORMS A BARRIER BETWEEN THE INDIVIDUAL INSULATED CONDUCTORS OF THE CABLE. THIS BARRIER ACTS TO PREVENT ENTRY INTO THE CABLE OF THE PRODUCTS OF AN EXPLOSION WITHIN THE ENCLOSURE. THE GLAND IS CERTIFIED Exd IIC.

WARNING: ON EARLIER VERSIONS OF THE ABOVE CABLE SUPPLIED BY WESTINGHOUSE/ROSEMOUNT, THE GLANDS, ALTHOUGH CERTIFIED Exd IIC, WERE NOT OF THE BARRIER GLAND TYPE. THIS GLAND SHOULD NOT BE USED WITH THE WC3000 INSITU OXYGEN ANALYSER. ROSEMOUNT CAN SUPPLY A BARRIER GLAND KIT TO REPLACE SUCH GLANDS. THE KIT (P/N 1U03066G07), COMPRISES OF TWO BARRIER GLANDS COMPLETE WITH PUTTY, CRIMPS AND AN INSTRUCTION SHEET. PLEASE NOTE THAT YOU SHOULD USE ONLY PUTTY WHICH IS PLASTIC AND CAPABLE OF BEING MIXED. YOU SHOULD NOT USE CRYSTALLISED OR HARD PUTTY.

(8) CABLE ANCHORAGE:

THE PROBE JUNCTION BOX DOES NOT INCLUDE ANY SPECIFIC MEANS FOR CABLE ANCHORAGE. THE CABLE GLAND CHOSEN MUST BE ONE WHICH PROVIDES CABLE ANCHORAGE. THE BARRIER (STOPPER) GLAND SUPPLIED BY ROSEMOUNT AS PART OF THE PROBE CABLE ASSEMBLY, WILL PROVIDE CABLE ANCHORAGE.

(9) INSTRUCTION BULLETINS (USER MANUALS):

DEPENDING ON THE ELECTRONICS CONTROL UNIT USED, THE APPLICABLE INSTRUCTION BULLETINS ARE AS FOLLOWS:

IB-106-300NEX : USED IN THE "EXCHANGE PROBE" CONFIGURATION AND IN THE "FULLY CENELEC CERTIFIED" CONFIGURATION

IB-106-300NFX : USED WITH IFT3000 ELECTRONICS.

IB-106-300NCX : USED WITH CRE3000 ELECTRONICS.

THESE INSTRUCTION BULLETINS CONTAIN ESSENTIAL INFORMATION AND MUST BE USED WHEN WORKING ON THE APPARATUS.

(10) NAMEPLATE (LABEL):

ENSURE THAT NAMEPLATE (ITEM 15) IS AT ALL TIMES VISIBLE. AT INSTALLATION, ALLOWANCE MUST BE MADE FOR THIS.

(11) EARTHING OF THE APPARATUS:

THE APPARATUS HAS BEEN FITTED WITH BOTH EXTERNAL (ITEM 16) AND INTERNAL (ITEM 17) EARTHING POINTS. ADEQUATE EARTH CONNECTIONS SHOULD BE MADE TO BOTH THESE POINTS.

(12) MATCHING OF JUNCTION BOX LID WITH JUNCTION BOX :

THE JUNCTION LID AND THE JUNCTION BOX ARE A MATCHED PAIR. WHEN FULLY SCREWED ON, THE SETSCREW THREADED HOLE ON THE LID LINES UP WITH AN UNDERCUT AT THE BOTTOM OF THE JUNCTION BOX. THE SETSCREW ENGAGES INTO THIS UNDERCUT. IF YOU HAVE A NUMBER OF PROBES, THEN TAKE CARE TO KEEP THE LID AND PROBE MATCHED.

(13) LIFTING & CARRYING:

BOTH THE PROBE AND ABRASIVE SHIELD ARE HEAVY PIECES OF EQUIPMENT. LIFTING AND CARRYING PROCEDURES SHOULD TAKE ACCOUNT OF THIS WEIGHT.

DESIGN	DATE	BY	CHKD	DATE	BY
J.V. 9/11/94	7/6/94	J.V.	J.V.	7/6/94	J.V.
APPR	DATE	BY	CHKD	DATE	BY
TITLE					
SAFETY DATA SHEET FOR					
CENELEC APPROVED WC3000 PROBE					
Dwg No 1M03226					
SHEET 4					

ROSEMOUNT

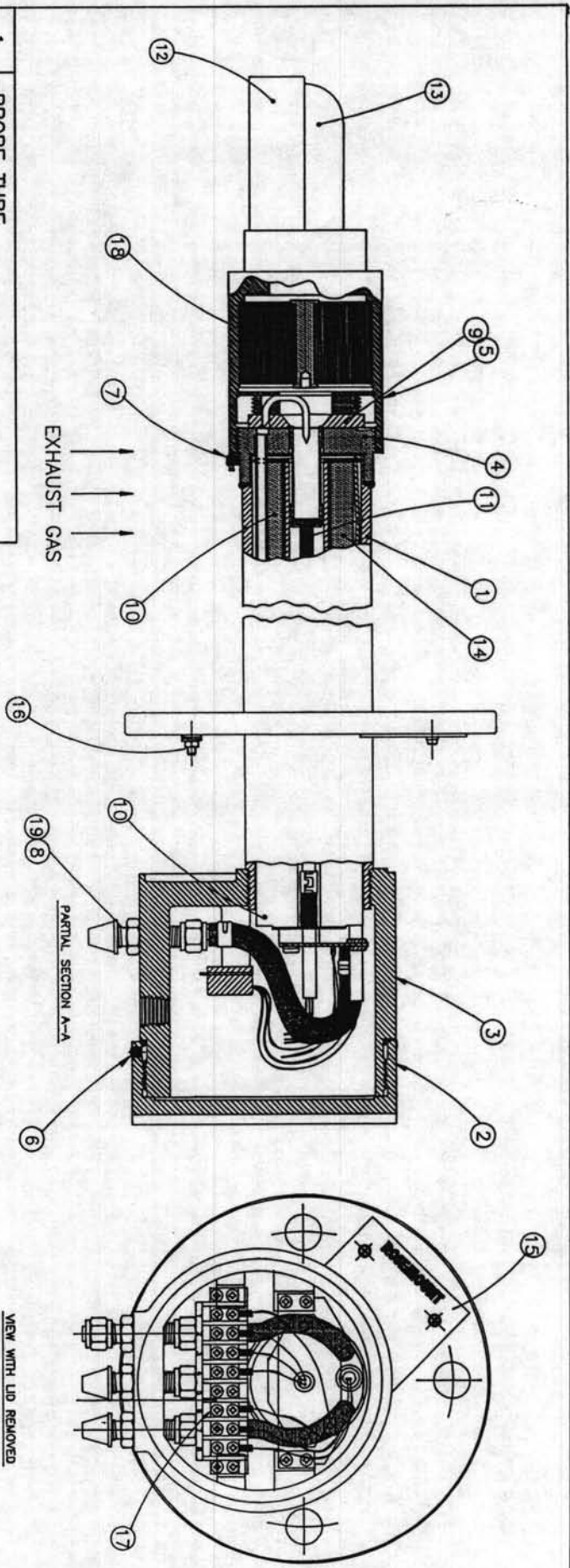


FIGURE 1

1	PROBE TUBE	19	CAPILLARY ARRAY (BREATHING DEVICE)
2	JUNCTION BOX COVER	18	FLAME ARRESTOR (BREATHING DEVICE)
3	JUNCTION BOX	17	INTERNAL EARTH (TERMINAL 6)
4	PROBE END FLANGE	16	EXTERNAL EARTH
5	FLAME ARRESTOR HUB ASSEMBLY	15	ISSEP NAMEPLATE (LABEL)
6	JUNCTION BOX SET SCREW	14	44 VOLT PROBE HEATER
7	FLAME ARRESTOR HUB SET SCREW		
8	BULKHEAD UNION FITTING		
9	ZIRCONIUM CELL		
10	STRUT ASSY.		
11	CONTACT & THERMOCOUPLE ASSY.		
12	VEE DEFLECTOR ASSY.		
13	CERAMIC DIFFUSER ELEMENT		

05553 16-2-93	05934 4-2-94	THIS DRAWING AFFECTS CENELEC CERTIFICATION. NO REVISION ALLOWED WITHOUT CHECKING AND APPROVAL BY THE PRODUCT ENGINEER.		DATED 1/11/14 J. O'Connell ENGR APPROV	TITLE SAFETY DATA SHEET FOR CENELEC APPROVED WC3000 PROBE
DESCRIPTION 1 2		DESCRIPTION 19 18 17 16 15 14		SCALE 1:1	SHEET 5

DEO	05553	1
	16-2-93	
DEO	05934	2
	4-2-94	

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APPROVAL BY THE PRODUCT ENGINEER.

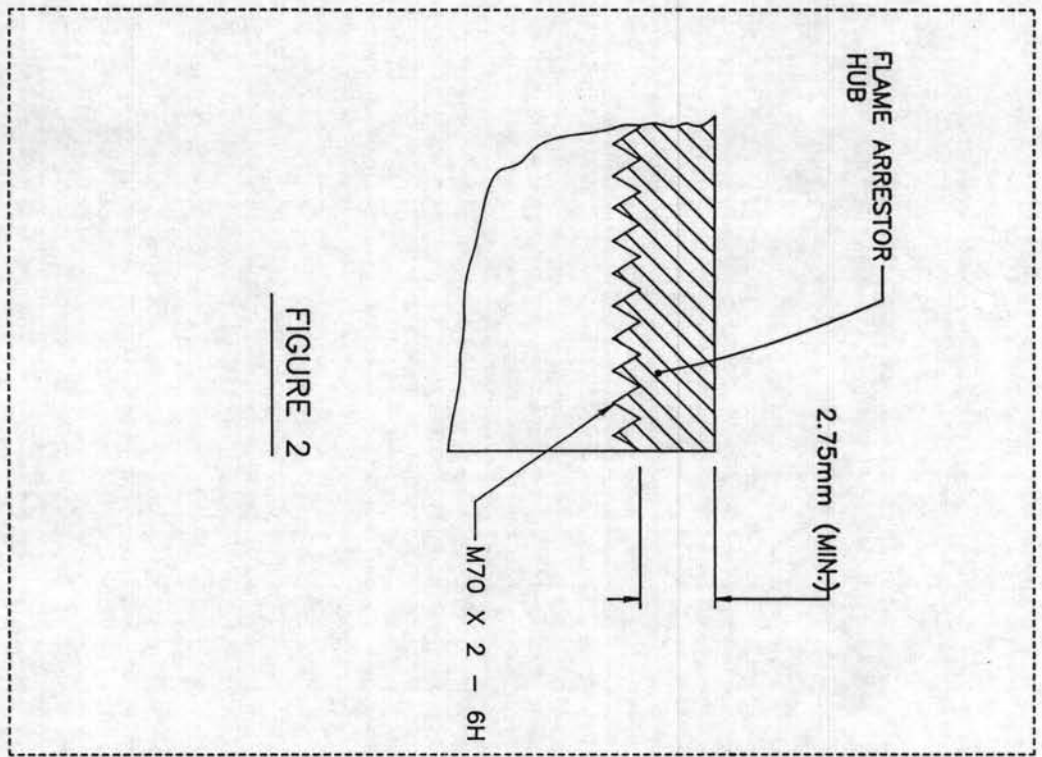


FIGURE 2

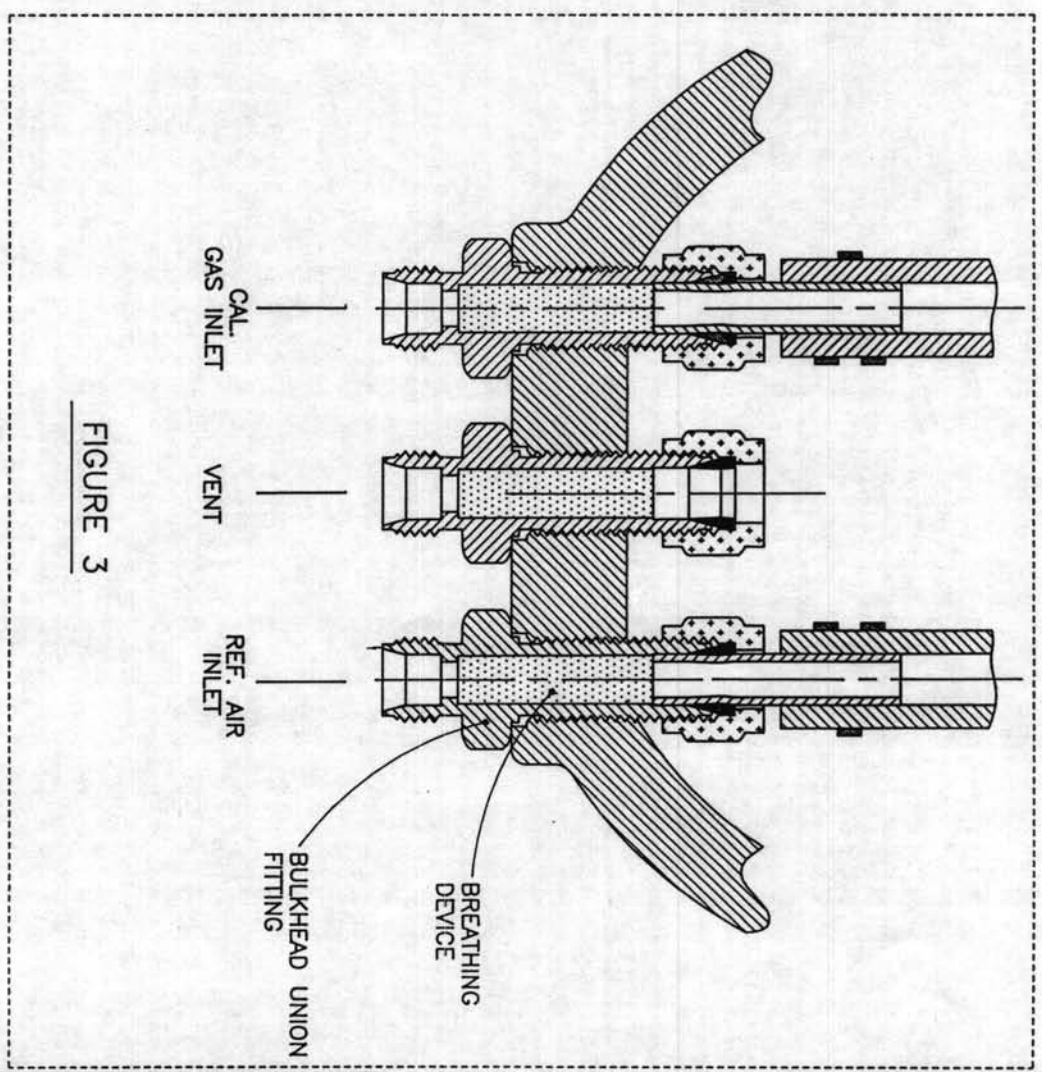


FIGURE 3

DRAFT J. V. 11/13/94 ENGR J. V. 11/13/94 APPR J. V. 11/13/94		ROSEMOUNT SAFETY DATA SHEET FOR CENELEC APPROVED WC3000 PROB	
SIZE	DWG NO	SHEET	6
SCALE	1M03226		

HIGHLIGHTS OF CHANGES

Effective June, 1997 Rev. 4

PAGE	SUMMARY
--	General. Added snubber version of probe to manual. Text and art changed as necessary to reflect new style of probe.

Effective February, 1998 Rev. 4.1

PAGE	SUMMARY
2-2	Figure 2-1. Change calibration gas tube dimensions.
3-10	Add note on test gas flowmeter.

ROSEMOUNT WARRANTY

Rosemount warrants that the equipment manufactured and sold by it will, upon shipment, be free of defects in workmanship or material. Should any failure to conform to this warranty become apparent during a period of one year after the date of shipment, Rosemount shall, upon prompt written notice from the purchaser, correct such nonconformity by repair or replacement, F.O.B. factory of the defective part or parts. Correction in the manner provided above shall constitute a fulfillment of all liabilities of Rosemount with respect to the quality of the equipment.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF QUALITY WHETHER WRITTEN, ORAL, OR IMPLIED (INCLUDING ANY WARRANTY OF MERCHANTABILITY OF FITNESS FOR PURPOSE).

The remedy(ies) provided above shall be purchaser's sole remedy(ies) for any failure of Rosemount to comply with the warranty provisions, whether claims by the purchaser are based in contract or in tort (including negligence).

Rosemount does not warrant equipment against normal deterioration due to environment. Factors such as corrosive gases and solid particulates can be detrimental and can create the need for repair or replacement as part of normal wear and tear during the warranty period.

Equipment supplied by Rosemount Analytical Inc., but not manufactured by it, will be subject to the same warranty as is extended to Rosemount by the original manufacturer.

At the time of installation, it is important that the required services are supplied to the system and that the electronic controller is set up at least to the point where it is controlling the sensor heater. This will ensure that should there be a delay between installation and full commissioning, the sensor being supplied with ac power and reference air will not be subjected to component deterioration.

PURPOSE

The purpose of this manual is to provide a comprehensive understanding of the CENELEC Approved World Class 3000 Oxygen Analyzer components, functions, installation, and maintenance.

This manual is designed to provide information about the CENELEC Approved World Class 3000 Oxygen Analyzer. We recommend that you thoroughly familiarize yourself with the Overview and Installation sections before installing your emissions monitor.

The overview presents the basic principles of the CENELEC oxygen analyzer along with its performance characteristics and components. The remaining sections contain detailed procedures and information necessary to install and service the CENELEC approved oxygen analyzer.

Before contacting Rosemount concerning any questions, first consult this manual. It describes most situations encountered in your equipment's operation and details necessary action.

DEFINITIONS

The following definitions apply to WARNINGS, CAUTIONS, and NOTES found throughout this publication.

WARNING

Highlights an operation or maintenance procedure, practice, condition, statement, etc., that if not strictly observed, could result in injury, death, or long-term health hazards of personnel.

CAUTION

Highlights an operation or maintenance procedure, practice, condition, statement, etc., that if not strictly observed, could result in damage to or destruction of equipment, or loss of effectiveness.

NOTE

Highlights an essential operating procedure, condition, or statement.

 : EARTH (GROUND) TERMINAL

 : PROTECTIVE CONDUCTOR TERMINAL

 : RISK OF ELECTRICAL SHOCK

 : WARNING: REFER TO INSTRUCTION BULLETIN

NOTE TO USERS

The number in the lower right corner of each illustration in this publication is a manual illustration number. It is not a part number and is not related to the illustration in any technical manner.

IMPORTANT

SAFETY INSTRUCTIONS FOR THE WIRING AND INSTALLATION OF THIS APPARATUS

The following safety instructions apply specifically to all EU member states. They should be strictly adhered to in order to assure compliance with the Low Voltage Directive. Non-EU states should also comply with the following unless superseded by local or National Standards.




1. Adequate earth connections should be made to all earthing points, internal and external, where provided.
2. After installation or troubleshooting, all safety covers and safety grounds must be replaced. The integrity of all earth terminals must be maintained at all times.
3. Mains supply cords should comply with the requirements of IEC227 or IEC245.
4. All wiring shall be suitable for use in an ambient temperature of greater than 75°C.
5. All cable glands used should be of such internal dimensions as to provide adequate cable anchorage.
6. To ensure safe operation of this equipment, connection to the mains supply should only be made through a circuit breaker which will disconnect all circuits carrying conductors during a fault situation. The circuit breaker may also include a mechanically operated isolating switch. If not, then another means of disconnecting the equipment from the supply must be provided and clearly marked as such. Circuit breakers or switches must comply with a recognized standard such as IEC947. All wiring must conform with any local standards.
7. Where equipment or covers are marked with the symbol to the right, hazardous voltages are likely to be present beneath. These covers should only be removed when power is removed from the equipment — and then only by trained service personnel.
8. Where equipment or covers are marked with the symbol to the right, there is a danger from hot surfaces beneath. These covers should only be removed by trained service personnel when power is removed from the equipment. Certain surfaces may remain hot to the touch.
9. Where equipment or covers are marked with the symbol to the right, refer to the Operator Manual for instructions.
10. All graphical symbols used in this product are from one or more of the following standards: EN61010-1, IEC417, and ISO3864.



BELANGRIJK

Veiligheidsvoorschriften voor de aansluiting en installatie van dit toestel.




De hierna volgende veiligheidsvoorschriften zijn vooral bedoeld voor de EU lidstaten. Hier moet aan gehouden worden om de onderworpenheid aan de Laag Spannings Richtlijn (Low Voltage Directive) te verzekeren. Niet EU staten zouden deze richtlijnen moeten volgen tenzij zij reeds achterhaald zouden zijn door plaatselijke of nationale voorschriften.

1. Degelijke aardingsaansluitingen moeten gemaakt worden naar alle voorziene aardpunten, intern en extern.
2. Na installatie of controle moeten alle veiligheidsdeksels en -aardingen terug geplaatst worden. Ten alle tijde moet de betrouwbaarheid van de aarding behouden blijven.
3. Voedingskabels moeten onderworpen zijn aan de IEC227 of de IEC245 voorschriften.
4. Alle bekabeling moet geschikt zijn voor het gebruik in omgevingstemperaturen, hoger dan 75°C.
5. Alle wartels moeten zo gedimensioneerd zijn dat een degelijke kabel bevestiging verzekerd is.
6. Om de veilige werking van dit toestel te verzekeren, moet de voeding door een stroomonderbreker gevoerd worden (min 10A) welke alle draden van de voeding moet onderbreken. De stroomonderbreker mag een mechanische schakelaar bevatten. Zoniet moet een andere mogelijkheid bestaan om de voedingsspanning van het toestel te halen en ook duidelijk zo zijn aangegeven. Stroomonderbrekers of schakelaars moeten onderworpen zijn aan een erkende standaard zoals IEC947.
7. Waar toestellen of deksels aangegeven staan met het symbool is er meestal hoogspanning aanwezig. Deze deksels mogen enkel verwijderd worden nadat de voedingsspanning werd afgelegd en enkel door getraind onderhoudspersoneel.
8. Waar toestellen of deksels aangegeven staan met het symbool is er gevaar voor hete oppervlakken. Deze deksels mogen enkel verwijderd worden door getraind onderhoudspersoneel nadat de voedingsspanning verwijderd werd. Sommige oppervlakken kunnen 45 minuten later nog steeds heet aanvoelen.
9. Waar toestellen of deksels aangegeven staan met het symbool gelieve het handboek te raadplegen.
10. Alle grafische symbolen gebruikt in dit produkt, zijn afkomstig uit een of meer van devolgende standaards; EN61010-1, IEC417 en ISO3864.

VIGTIGT

Sikkerhedsinstruktion for tilslutning og installering af dette udstyr.




Følgende sikkerhedsinstruktioner gælder specifikt i alle EU-medlemslande. Instruktionerne skal nøje følges for overholdelse af Lavsspændingsdirektivet og bør også følges i ikke EU-lande medmindre andet er specificeret af lokale eller nationale standarder.

1. Passende jordforbindelser skal tilsluttes alle jordklemmer, interne og eksterne, hvor disse forefindes.
2. Efter installation eller fejlfinding skal alle sikkerhedsdæksler og jordforbindelser reetableres.
3. Forsyningskabler skal opfylde krav specificeret i IEC227 eller IEC245.
4. Alle ledningstilslutninger skal være konstrueret til omgivelsestemperatur højere end 75° C.
5. Alle benyttede kabelforskrutninger skal have en intern dimension, så passende kabelafastning kan etableres.
6. For opnåelse af sikker drift og betjening skal der skabes beskyttelse mod indirekte berøring gennem afbryder (min. 10A), som vil afbryde alle kredsløb med elektriske ledere i fejlsituation. Afbryderen skal indholde en mekanisk betjent kontakt. Hvis ikke skal anden form for afbryder mellem forsyning og udstyr benyttes og mærkes som sådan. Afbrydere eller kontakter skal overholde en kendt standard som IEC947.
7. Hvor udstyr eller dæksler er mærket med dette symbol, er farlige spændinger normalt forekommende bagved. Disse dæksler bør kun afmonteres, når forsyningsspændingen er frakoblet - og da kun af instrueret servicepersonale.
8. Hvor udstyr eller dæksler er mærket med dette symbol, forefindes meget varme overflader bagved. Disse dæksler bør kun afmonteres af instrueret servicepersonale, når forsyningsspænding er frakoblet. Visse overflader vil stadig være for varme at berøre i op til 45 minutter efter frakobling.
9. Hvor udstyr eller dæksler er mærket med dette symbol, se da i betjeningsmanual for instruktion.
10. Alle benyttede grafiske symboler i dette udstyr findes i én eller flere af følgende standarder:- EN61010-1, IEC417 & ISO3864.

BELANGRIJK

Veiligheidsinstructies voor de bedrading en installatie van dit apparaat.




Voor alle EU lidstaten zijn de volgende veiligheidsinstructies van toepassing. Om aan de geldende richtlijnen voor laagspanning te voldoen dient men zich hieraan strikt te houden. Ook niet EU lidstaten dienen zich aan het volgende te houden, tenzij de lokale wetgeving anders voorschrijft.

1. Alle voorziene interne- en externe aardaansluitingen dienen op adequate wijze aangesloten te worden.
2. Na installatie, onderhouds- of reparatie werkzaamheden dienen alle beschermdeksels /kappen en aardingen om reden van veiligheid weer aangebracht te worden.
3. Voedingskabels dienen te voldoen aan de vereisten van de normen IEC 227 of IEC 245.
4. Alle bedrading dient geschikt te zijn voor gebruik bij een omgevings temperatuur boven 75°C.
5. Alle gebruikte kabelwartels dienen dusdanige inwendige afmetingen te hebben dat een adequate verankering van de kabel wordt verkregen.
6. Om een veilige werking van de apparatuur te waarborgen dient de voeding uitsluitend plaats te vinden via een meerpolige automatische zekering (min.10A) die **alle** spanningvoerende geleiders verbreekt indien een foutconditie optreedt. Deze automatische zekering mag ook voorzien zijn van een mechanisch bediende schakelaar. Bij het ontbreken van deze voorziening dient een andere als zodanig duidelijk aangegeven mogelijkheid aanwezig te zijn om de spanning van de apparatuur af te schakelen. Zekeringen en schakelaars dienen te voldoen aan een erkende standaard zoals IEC 947.
7. Waar de apparatuur of de beschermdeksels/kappen gemarkeerd zijn met het volgende symbool, kunnen zich hieronder spanning voerende delen bevinden die gevaar op kunnen leveren. Deze beschermdeksels/kappen mogen uitsluitend verwijderd worden door getraind personeel als de spanning is afgeschakeld.
8. Waar de apparatuur of de beschermdeksels/kappen gemarkeerd zijn met het volgende symbool, kunnen zich hieronder hete oppervlakken of onderdelen bevinden. Bepaalde delen kunnen mogelijk na 45 min. nog te heet zijn om aan te raken.
9. Waar de apparatuur of de beschermdeksels/kappen gemarkeerd zijn met het volgende symbool, dient men de bedieningshandleiding te raadplegen.
10. Alle grafische symbolen gebruikt bij dit produkt zijn volgens een of meer van de volgende standaarden: EN 61010-1, IEC 417 & ISO 3864.

TÄRKEÄÄ

Turvallisuusohje, jota on noudatettava tämän laitteen asentamisessa ja kaapeloinnissa.

Seuraavat ohjeet pätevät erityisesti EU:n jäsenvaltioissa. Niitä täytyy ehdottomasti noudattaa jotta täytettäisiin EU:n matalajännitedirektiivin (Low Voltage Directive) yhteensopivuus. Myös EU:hun kuulumattomien valtioiden tulee noudattaa tätä ohjetta, elleivät kansalliset standardit estä sitä.

1. Riittävät maadoituskytkennät on tehtävä kaikkiin maadoituspisteisiin, sisäisiin ja ulkoisiin.
2. Asennuksen ja vianetsinnän jälkeen on kaikki suojat ja suojamaat asennettava takaisin paikoilleen. Maadoitusliittimen kunnollinen toiminta täytyy aina ylläpitää.
3. Jännitesyöttöjohtimien täytyy täyttää IEC227 ja IEC245 vaatimukset.
4. Kaikkien johdotuksien tulee toimia $>75^{\circ}\text{C}$ lämpötiloissa.
5. Kaikkien läpivientiholkkien sisähalkaisijan täytyy olla sellainen että kaapeli lukkiutuu kun nolla kiinni.
6. Turvallisen toiminnan varmistamiseksi täytyy jännitesyöttö varustaa turvakytkimellä (min 10A), joka kytkee irti kaikki jännitesyöttöjohtimet vikatilanteessa. Suojaan täytyy myös sisältyä mekaaninen erotuskytkin. Jos ei, niin jännitesyöttö on pystyttävä katkaisemaan muilla keinoilla ja merkittävä siten että se tunnistetaan sellaiseksi. Turvakytkimien tai katkaisimien täytyy täyttää IEC947 standardin vaatimukset näkyvyydestä.
7. Mikäli laite tai kosketussuoja on merkitty tällä merkillä on merkinnän takana tai alla hengenvaarallisen suuruinen jännite. Suojaa ei saa poistaa jänniteen ollessa kytkettynä laitteeseen ja poistamisen saa suorittaa vain alan asiantuntija.
8. Mikäli laite tai kosketussuoja on merkitty tällä merkillä on merkinnän takana tai alla kuuma pinta. Suojaa saa poistaa vain alan asiantuntija kun jännite-syöttö on katkaistu. Tällainen pinta voi säilyä kosketuskuumana jopa 45 minuuttia.
9. Mikäli laite tai kosketussuoja on merkitty tällä merkillä katso lisäohjeita käyttöohjekirjasta
10. Kaikki tässä tuotteessa käytetyt graafiset symbolit ovat yhdestä tai useammasta seuraavista standardeista: EN61010-1, IEC417 & ISO3864.

IMPORTANT

Consignes de sécurité concernant le raccordement et l'installation de cet appareil.

Les consignes de sécurité ci-dessous s'adressent particulièrement à tous les états membres de la communauté européenne. Elles doivent être strictement appliquées afin de satisfaire aux directives concernant la basse tension. Les états non membres de la communauté européenne doivent également appliquer ces consignes sauf si elles sont en contradiction avec les standards locaux ou nationaux.




1. Un raccordement adéquate à la terre doit être effectuée à chaque borne de mise à la terre, interne et externe.
2. Après installation ou dépannage, tous les capots de protection et toutes les prises de terre doivent être remis en place, toutes les prises de terre doivent être respectées en permanence.
3. Les câbles d'alimentation électrique doivent être conformes aux normes IEC227 ou IEC245
4. Tous les raccordements doivent pouvoir supporter une température ambiante supérieure à 75°C.
5. Tous les presse-étoupes utilisés doivent avoir un diamètre interne en rapport avec les câbles afin d'assurer un serrage correct sur ces derniers.
6. Afin de garantir la sécurité du fonctionnement de cet appareil, le raccordement à l'alimentation électrique doit être réalisé exclusivement au travers d'un disjoncteur (minimum 10A.) isolant tous les conducteurs en cas d'anomalie. Ce disjoncteur doit également pouvoir être actionné manuellement, de façon mécanique. Dans le cas contraire, un autre système doit être mis en place afin de pouvoir isoler l'appareil et doit être signalisé comme tel. Disjoncteurs et interrupteurs doivent être conformes à une norme reconnue telle IEC947.
7. Lorsque les équipements ou les capots affichent le symbole suivant, cela signifie que des tensions dangereuses sont présentes. Ces capots ne doivent être démontés que lorsque l'alimentation est coupée, et uniquement par un personnel compétent.
8. Lorsque les équipements ou les capots affichent le symbole suivant, cela signifie que des surfaces dangereusement chaudes sont présentes. Ces capots ne doivent être démontés que lorsque l'alimentation est coupée, et uniquement par un personnel compétent. Certaines surfaces peuvent rester chaudes jusqu'à 45 mn.
9. Lorsque les équipements ou les capots affichent le symbole suivant, se reporter au manuel d'instructions.
10. Tous les symboles graphiques utilisés dans ce produit sont conformes à un ou plusieurs des standards suivants: EN61010-1, IEC417 & ISO3864.



Wichtig

Sicherheitshinweise für den Anschluß und die Installation dieser Geräte.

Die folgenden Sicherheitshinweise sind in allen Mitgliederstaaten der europäischen Gemeinschaft gültig. Sie müssen strikt eingehalten werden, um der Niederspannungsrichtlinie zu genügen. Nichtmitgliedsstaaten der europäischen Gemeinschaft sollten die national gültigen Normen und Richtlinien einhalten.

1. Alle intern und extern vorgesehenen Erdungen der Geräte müssen ausgeführt werden.
2. Nach Installation, Reparatur oder sonstigen Eingriffen in das Gerät müssen alle Sicherheitsabdeckungen und Erdungen wieder installiert werden. Die Funktion aller Erdverbindungen darf zu keinem Zeitpunkt gestört sein.
3. Die Netzspannungsversorgung muß den Anforderungen der IEC227 oder IEC245 genügen.
4. Alle Verdrahtungen sollten mindestens bis 75 °C ihre Funktion dauerhaft erfüllen.
5. Alle Kabeldurchführungen und Kabelverschraubungen sollten in Ihrer Dimensionierung so gewählt werden, daß diese eine sichere Verkabelung des Gerätes ermöglichen.
6. Um eine sichere Funktion des Gerätes zu gewährleisten, muß die Spannungsversorgung über mindestens 10 A abgesichert sein. Im Fehlerfall muß dadurch gewährleistet sein, daß die Spannungsversorgung zum Gerät bzw. zu den Geräten unterbrochen wird. Ein mechanischer Schutzschalter kann in dieses System integriert werden. Falls eine derartige Vorrichtung nicht vorhanden ist, muß eine andere Möglichkeit zur Unterbrechung der Spannungszufuhr gewährleistet werden mit Hinweisen deutlich gekennzeichnet werden. Ein solcher Mechanismus zur Spannungsunterbrechung muß mit den Normen und Richtlinien für die allgemeine Installation von Elektrogeräten, wie zum Beispiel der IEC947, übereinstimmen.
7. Mit dem Symbol sind Geräte oder Abdeckungen gekennzeichnet, die eine gefährliche (Netzspannung) Spannung führen. Die Abdeckungen dürfen nur entfernt werden, wenn die Versorgungsspannung unterbrochen wurde. Nur geschultes Personal darf an diesen Geräten Arbeiten ausführen. 
8. Mit dem Symbol sind Geräte oder Abdeckungen gekennzeichnet, in bzw. unter denen heiße Teile vorhanden sind. Die Abdeckungen dürfen nur entfernt werden, wenn die Versorgungsspannung unterbrochen wurde. Nur geschultes Personal darf an diesen Geräten Arbeiten ausführen. Bis 45 Minuten nach dem Unterbrechen der Netzzufuhr können derartig Teile noch über eine erhöhte Temperatur verfügen. 
9. Mit dem Symbol sind Geräte oder Abdeckungen gekennzeichnet, bei denen vor dem Eingriff die entsprechenden Kapitel im Handbuch sorgfältig durchgelesen werden müssen. 
10. Alle in diesem Gerät verwendeten graphischen Symbole entspringen einem oder mehreren der nachfolgend aufgeführten Standards: EN61010-1, IEC417 & ISO3864.

IMPORTANTE

Norme di sicurezza per il cablaggio e l'installazione dello strumento.

Le seguenti norme di sicurezza si applicano specificatamente agli stati membri dell'Unione Europea, la cui stretta osservanza è richiesta per garantire conformità alla Direttiva del Basso Voltaggio. Esse si applicano anche agli stati non appartenenti all'Unione Europea, salvo quanto disposto dalle vigenti normative locali o nazionali.




1. Collegamenti di terra idonei devono essere eseguiti per tutti i punti di messa a terra interni ed esterni, dove previsti.
2. Dopo l'installazione o la localizzazione dei guasti, assicurarsi che tutti i coperchi di protezione siano stati collocati e le messa a terra siano collegate. L'integrità di ciascun morsetto di terra deve essere costantemente garantita.
3. I cavi di alimentazione della rete devono essere secondo disposizioni IEC227 o IEC245.
4. L'intero impianto elettrico deve essere adatto per uso in ambiente con temperature superiore a 75°C.
5. Le dimensioni di tutti i connettori dei cavi utilizzati devono essere tali da consentire un adeguato ancoraggio al cavo.
6. Per garantire un sicuro funzionamento dello strumento il collegamento alla rete di alimentazione principale dovrà essere eseguita tramite interruttore automatico (min.10A), in grado di disattivare tutti i conduttori di circuito in caso di guasto. Tale interruttore dovrà inoltre prevedere un sezionatore manuale o altro dispositivo di interruzione dell'alimentazione, chiaramente identificabile. Gli interruttori dovranno essere conformi agli standard riconosciuti, quali IEC947.
7. Il simbolo riportato sullo strumento o sui coperchi di protezione indica probabile presenza di elevati voltaggi. Tali coperchi di protezione devono essere rimossi esclusivamente da personale qualificato, dopo aver tolto alimentazione allo strumento.
8. Il simbolo riportato sullo strumento o sui coperchi di protezione indica rischio di contatto con superfici ad alta temperatura. Tali coperchi di protezione devono essere rimossi esclusivamente da personale qualificato, dopo aver tolto alimentazione allo strumento. Alcune superfici possono mantenere temperature elevate per oltre 45 minuti.
9. Se lo strumento o il coperchio di protezione riportano il simbolo, fare riferimento alle istruzioni del manuale Operatore.
10. Tutti i simboli grafici utilizzati in questo prodotto sono previsti da uno o più dei seguenti standard: EN61010-1, IEC417 e ISO3864.



VIKTIG

Sikkerhetsinstruks for tilkobling og installasjon av dette utstyret.




Følgende sikkerhetsinstruksjoner gjelder spesifikt alle EU medlemsland og land med i EØS-avtalen. Instruksjonene skal følges nøye slik at installasjonen blir i henhold til lavspenningsdirektivet. Den bør også følges i andre land, med mindre annet er spesifisert av lokale- eller nasjonale standarder.

1. Passende jordforbindelser må tilkobles alle jordingspunkter, interne og eksterne hvor disse forefinnes.
2. Etter installasjon eller feilsøking skal alle sikkerhetsdeksler og jordforbindelser reetableres. Jordingsforbindelsene må alltid holdes i god stand.
3. Kabler fra spenningsforsyning skal oppfylle kravene spesifisert i IEC227 eller IEC245.
4. Alle ledningsforbindelser skal være konstruert for en omgivelsestemperatur høyere en 750C.
5. Alle kabelforskruvninger som benyttes skal ha en indre dimensjon slik at tilstrekkelig avlastning oppnåes.
6. For å oppnå sikker drift og betjening skal forbindelsen til spenningsforsyningen bare skje gjennom en strømbryter (minimum 10A) som vil bryte spenningsforsyningen til alle elektriske kretser ved en feilsituasjon. Strømbryteren kan også inneholde en mekanisk operert bryter for å isolere instrumentet fra spenningsforsyningen. Dersom det ikke er en mekanisk operert bryter installert, må det være en annen måte å isolere utstyret fra spenningsforsyningen, og denne måten må være tydelig merket. Kretsbytere eller kontakter skal oppfylle kravene i en annerkjent standard av typen IEC947 eller tilsvarende.
7. Der hvor utstyr eller deksler er merket med symbol for farlig spenning, er det sannsynlig at disse er tilstede bak dekslet. Disse dekslene må bare fjernes når spenningsforsyning er frakoblet utstyret, og da bare av trenet servicepersonell.
8. Der hvor utstyr eller deksler er merket med symbol for meget varm overflate, er det sannsynlig at disse er tilstede bak dekslet. Disse dekslene må bare fjernes når spenningsforsyning er frakoblet utstyret, og da bare av trenet servicepersonell. Noen overflater kan være for varme til å berøres i opp til 45 minutter etter spenningsforsyning frakoblet.
9. Der hvor utstyret eller deksler er merket med symbol, vennligst referer til instruksjonsmanualen for instruksjer.
10. Alle grafiske symboler brukt i dette produktet er fra en eller flere av følgende standarder: EN61010-1, IEC417 & ISO3864.

IMPORTANTE

Instruções de segurança para ligação e instalação deste aparelho.

As seguintes instruções de segurança aplicam-se especificamente a todos os estados membros da UE. Devem ser observadas rigidamente por forma a garantir o cumprimento da Directiva sobre Baixa Tensão. Relativamente aos estados que não pertençam à UE, deverão cumprir igualmente a referida directiva, exceptuando os casos em que a legislação local a tiver substituído.

1. Devem ser feitas ligações de terra apropriadas a todos os pontos de terra, internos ou externos.
2. Após a instalação ou eventual reparação, devem ser recolocadas todas as tampas de segurança e terras de protecção. Deve manter-se sempre a integridade de todos os terminais de terra.
3. Os cabos de alimentação eléctrica devem obedecer às exigências das normas IEC227 ou IEC245.
4. Os cabos e fios utilizados nas ligações eléctricas devem ser adequados para utilização a uma temperatura ambiente até 75° C.
5. As dimensões internas dos buçins dos cabos devem ser adequadas a uma boa fixação dos cabos.
6. Para assegurar um funcionamento seguro deste equipamento, a ligação ao cabo de alimentação eléctrica deve ser feita através de um disjuntor (min. 10A) que desligará todos os condutores de circuitos durante uma avaria. O disjuntor poderá também conter um interruptor de isolamento accionado manualmente. Caso contrário, deverá ser instalado qualquer outro meio para desligar o equipamento da energia eléctrica, devendo ser assinalado convenientemente. Os disjuntores ou interruptores devem obedecer a uma norma reconhecida, tipo IEC947.
7. Sempre que o equipamento ou as tampas contiverem o símbolo, é provável a existência de tensões perigosas. Estas tampas só devem ser retiradas quando a energia eléctrica tiver sido desligada e por Pessoal da Assistência devidamente treinado. 
8. Sempre que o equipamento ou as tampas contiverem o símbolo, há perigo de existência de superfícies quentes. Estas tampas só devem ser retiradas por Pessoal da Assistência devidamente treinado e depois de a energia eléctrica ter sido desligada. Algumas superfícies permanecem quentes até 45 minutos depois. 
9. Sempre que o equipamento ou as tampas contiverem o símbolo, o Manual de Funcionamento deve ser consultado para obtenção das necessárias instruções. 
10. Todos os símbolos gráficos utilizados neste produto baseiam-se em uma ou mais das seguintes normas: EN61010-1, IEC417 e ISO3864.

IMPORTANTE

Instrucciones de seguridad para el montaje y cableado de este aparato.

Las siguientes instrucciones de seguridad , son de aplicacion especifica a todos los miembros de la UE y se adjuntaran para cumplir la normativa europea de baja tension.




1. Se deben proveer conexiones a tierra del equipo, tanto externa como internamente, en aquellos terminales previstos al efecto.
2. Una vez finalizada las operaciones de mantenimiento del equipo, se deben volver a colocar las cubiertas de seguridad aasi como los terminales de tierra. Se debe comprobar la integridad de cada terminal.
3. Los cables de alimentacion electrica cumplan con las normas IEC 227 o IEC 245.
4. Todo el cableado sera adecuado para una temperatura ambiental de 75°C.
5. Todos los prensaestopas seran adecuados para una fijacion adecuada de los cables.
6. Para un manejo seguro del equipo, la alimentacion electrica se realizara a traves de un interruptor magnetotermico (min 10 A), el cual desconectara la alimentacion electrica al equipo en todas sus fases durante un fallo. Los interruptores estaran de acuerdo a la norma IEC 947 u otra de reconocido prestigio.
7. Cuando las tapas o el equipo lleve impreso el simbolo de tension electrica peligrosa, dicho alojamiento solamente se abrira una vez que se haya interrumpido la alimentacion electrica al equipo asimismo la intervencion sera llevada a cabo por personal entrenado para estas labores.
8. Cuando las tapas o el equipo lleve impreso el simbolo, hay superficies con alta temperatura, por tanto se abrira una vez que se haya interrumpido la alimentacion electrica al equipo por personal entrenado para estas labores, y al menos se esperara unos 45 minutos para enfriar las superficies calientes.
9. Cuando el equipo o la tapa lleve impreso el simbolo, se consultara el manual de instrucciones.
10. Todos los simbolos graficos usados en esta hoja, estan de acuerdo a las siguientes normas EN61010-1, IEC417 & ISO 3864.



VIKTIGT

Säkerhetsföreskrifter för kablage och installation av denna apparat.

Följande säkerhetsföreskrifter är tillämpliga för samtliga EU-medlemsländer. De skall följas i varje avseende för att överensstämma med Lågspännings direktivet. Icke EU medlemsländer skall också följa nedanstående punkter, såvida de inte övergrips av lokala eller nationella föreskrifter.

1. Tillämplig jordkontakt skall utföras till alla jordade punkter, såväl internt som externt där så erfordras.
2. Efter installation eller felsökning skall samtliga säkerhetshöljen och säkerhetsjord återplaceras. Samtliga jordterminaler måste hållas obrutna hela tiden.
3. Matningsspänningens kabel måste överensstämma med föreskrifterna i IEC227 eller IEC245.
4. Allt kablage skall vara lämpligt för användning i en omgivningstemperatur högre än 75°C.
5. Alla kabelförskruvningar som används skall ha inre dimensioner som motsvarar adekvat kabelförankring.
6. För att säkerställa säker drift av denna utrustning skall anslutning till huvudströmmen endast göras genom en säkring (min 10A) som skall fränkoppla alla strömförande kretsar när något fel uppstår. Säkringen kan även ha en mekanisk fränskiljare. Om så inte är fallet, måste ett annat förfarande för att fränskilja utrustningen från strömförsörjning tillhandahållas och klart framgå genom markering. Säkring eller omkopplare måste överensstämma med en gällande standard såsom t ex IEC947.
7. Där utrustning eller hölje är markerad med vidstående symbol föreligger risk för livsfarlig spänning i närheten. Dessa höljen får endast avlägsnas när strömmen ej är ansluten till utrustningen - och då endast av utbildad servicepersonal.
8. När utrustning eller hölje är markerad med vidstående symbol föreligger risk för brännskada vid kontakt med uppvärmd yta. Dessa höljen får endast avlägsnas av utbildad servicepersonal, när strömmen kopplats från utrustningen. Vissa ytor kan vara mycket varma att vidröra även upp till 45 minuter efter avstängning av strömmen.
9. När utrustning eller hölje markerats med vidstående symbol bör instruktionsmanualen studeras för information.
10. Samtliga grafiska symboler som förekommer i denna produkt finns angivna i en eller flera av följande föreskrifter:- EN61010-1, IEC417 & ISO3864.

ΠΡΟΣΟΧΗ

Οδηγίες ασφαλείας για την καλωδίωση και εγκατάσταση της συσκευής.

Οι ακόλουθες οδηγίες ασφαλείας εφαρμόζονται ειδικά σε όλες τις χώρες μέλη της Ευρωπαϊκής Κοινότητας. Θα πρέπει να ακολουθούνται αυστηρά ώστε να εξασφαλιστεί η συμβατότητα με τις οδηγίες για τη Χαμηλή Τάση. Χώρες που δεν είναι μέλη της Ευρωπαϊκής Κοινότητας θα πρέπει επίσης να ακολουθούν τις οδηγίες εκτός εάν αντικαθίστανται από τα Τοπικά ή Εθνικά Πρότυπα.




1. Επαρκείς συνδέσεις γείωσης θα πρέπει να γίνονται σε όλα τα σημεία γείωσης, εσωτερικά και εξωτερικά όπου υπάρχουν.
2. Μετά την εγκατάσταση ή την εκσφαλμάτωση όλα τα καλύματα ασφαλείας και οι γειώσεις ασφαλείας πρέπει να επανεγκαθίστανται. Η καλή κατάσταση όλων των ακροδεκτών γείωσης πρέπει να ελέγχεται και να συντηρείται διαρκώς.
3. Τα καλώδια τροφοδοσίας πρέπει να πληρούν τις απαιτήσεις των IEC227 ή IEC245.
4. Όλες οι καλωδιώσεις θα πρέπει είναι κατάλληλες για χρήση σε ατμοσφαιρική θερμοκρασία χώρου υψηλότερη από 75°C.
5. Όλοι οι στυπιοθλίπτες θα πρέπει να είναι τέτοιων εσωτερικών διαστάσεων ώστε να παρέχουν επαρκή στερέωση των καλωδίων.
6. Για τη διασφάλιση ασφαλούς λειτουργίας της σύνδεσης τροφοδοσίας αυτής της συσκευής θα πρέπει να γίνεται μόνο μέσω ασφαλειοδιακόπτη (ελάχιστο 10A) ο οποίος θα αποσυνδέει όλους του ηλεκτροφόρους αγωγούς στη διάρκεια κατάστασης σφάλματος.
Ο ασφαλειοδιακόπτης μπορεί επίσης να περιλαμβάνει μηχανικό διακόπτη απομόνωσης. Εάν δεν περιλαμβάνει, τότε άλλα μέσα αποσύνδεσης της συσκευής από την τροφοδοσία πρέπει να παροχρηθούν και σαφώς να σημειθούν σαν τέτοια. Οι ασφαλειοδιακόπτες ή διακόπτες πρέπει να συμφωνούν με αναγνωρισμένα πρότυπα όπως το IEC947.
7. Όπου συσκευές ή καλύματα είναι σημασμένα με το σύμβολο επικίνδυνες τάσεις ενυπάρχουν κάτω από αυτά.
Αυτά τα καλύματα θα πρέπει να αφαιρούνται μόνο όταν έχει αφαιρεθεί η τροφοδοσία από τη συσκευή και τότε μόνο από ειδικευμένο τεχνικό προσωπικό.
8. Όπου συσκευές ή καλύματα είναι σημασμένα με το σύμβολο υπάρχει κίνδυνος από καυτές επιφάνειες κάτω από αυτά.
Αυτά τα καλύματα θα πρέπει να αφαιρούνται μόνο από ειδικευμένο τεχνικό προσωπικό, όταν η τροφοδοσία έχει αφαιρεθεί από τη συσκευή. Τέτοιες επιφάνειες μπορούν να παραμείνουν ζεστές στην αφή έως και 45 λεπτά αργότερα.
9. Όπου συσκευές ή καλύματα είναι σημασμένα με το σύμβολο αναφερόμεται στις οδηγίες χρήσης της συσκευής.
10. Όλα τα γραφικά σύμβολα που χρησιμοποιούνται σε αυτό το προϊόν είναι από ένα ή περισσότερα από τα έγχρωμα πρότυπα: EN61010-1, IEC417 και ISO3864.

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SECTION I. DESCRIPTION

1-1. COMPONENT CHECKLIST OF TYPICAL SYSTEM (PACKAGE CONTENTS). A typical Rosemount World Class 3000 Oxygen Analyzer (CENELEC approved) with IFT 3000 Intelligent Field Transmitter (CENELEC approved) should contain the items shown in Figure 1-1. Record the Part Number, Serial Number, and Order Number for each component of your system in the table located on the cover of this manual.

WARNING

The IFT 3000, Oxygen Analyzer (Probe), and probe abrasive shield are heavy. Lifting and carrying procedures should take account of this weight.

Transmitter (CENELEC approved). The Intelligent Field Transmitter (IFT) can be interfaced with one World Class 3000 probe. The IFT provides all necessary intelligence for controlling the probe and optional MPS 3000 Multiprobe Gas Sequencer.

WARNING

The Rosemount encode sheets (Product Ordering Matrix) allow a customer to order either the hazardous area version of the IFT 3000 or the non-hazardous area version. The hazardous area version has the symbol "EExd" on the apparatus nameplate. The non-hazardous area version does not. Ensure that if you have received the non-hazardous version that you do not install it in a potentially explosive atmosphere. This also applies to the hazardous/non-hazardous versions of the HPS 3000.

1-2. SYSTEM OVERVIEW.

- a. **Scope.** This Instruction Bulletin has been designed to supply details needed to install, start up, operate, and maintain the Rosemount World Class 3000 Oxygen Analyzer (CENELEC approved) with IFT 3000 Intelligent Field

ITEM	DESCRIPTION
1	Intelligent Field Transmitter (CENELEC approved)
2	Instruction Bulletin
3	Multiprobe Test Gas Sequencer (Optional)
4	Heater Power Supply (CENELEC approved)(Optional)
5	Oxygen Analyzer (Probe) (CENELEC approved)
6	System Cable
7	Mounting Plate with Mounting Hardware and Gasket
8	Reference AIR set (optional)

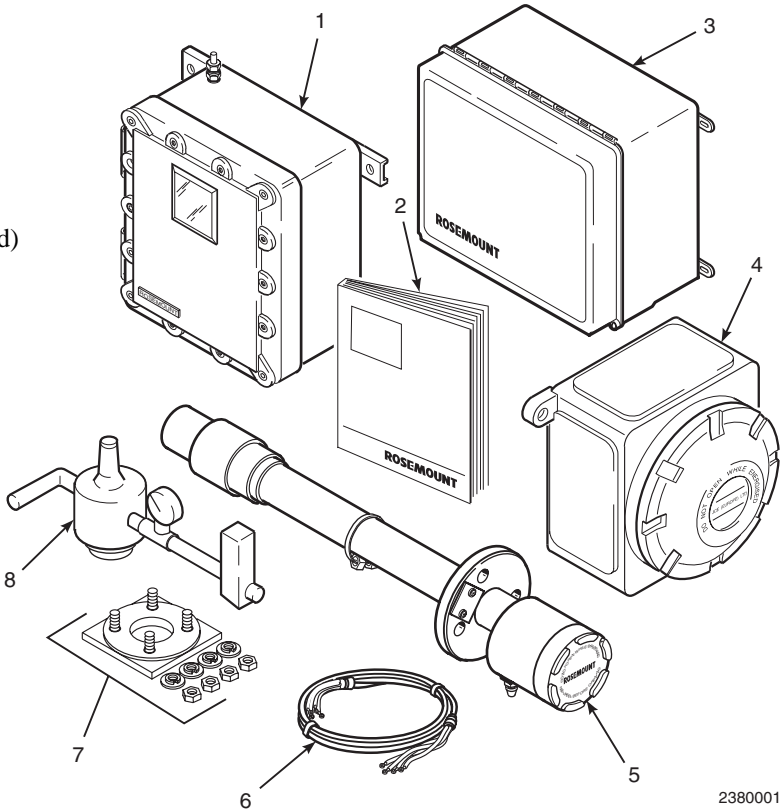


Figure 1-1. Typical System Package

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- b. **System Description.** The Rosemount Oxygen Analyzer (Probe) is designed to measure the net concentration of oxygen in an industrial process; i.e., the oxygen remaining after all fuels have been oxidized. The probe is permanently positioned within an exhaust duct or stack and performs its task without the use of a sampling system.

The equipment measures oxygen percentage by reading the voltage developed across a heated electrochemical cell, which consists of a small Yttria-stabilized, Zirconia disc. Both sides of the disc are coated with porous metal electrodes. When operated at the proper temperature, the millivolt output voltage of the cell is given by the following Nernst equation:

$$EMF = KT \log_{10}(P_1/P_2) + C$$

Where:

1. P_2 is the partial pressure of the oxygen in the measured gas on one side of the cell,
2. P_1 is the partial pressure of the oxygen in the reference gas on the other side,
3. T is the absolute temperature,
4. C is the cell constant,
5. K is an arithmetic constant.

NOTE

For best results, use clean, dry, instrument air (20.95% oxygen) as a reference gas.

When the cell is at operating temperature, and there are unequal oxygen concentrations across the cell, oxygen ions will travel from the high partial pressure of oxygen side to the low partial pressure side of the cell. The resulting logarithmic output voltage is approximately 50 mV per decade. Because the magnitude of the output is proportional to the logarithm of the inverse of the sample of the oxygen partial pressure, the output signal increases as the oxygen concentration of the sample gas decreases. This characteristic enables the oxygen analyzer to provide exceptional sensitivity at low oxygen concentrations.

Oxygen analyzer equipment measures net oxygen concentration in the presence of all the products of combustion, including water vapor. Therefore, it may be considered an analysis on a "wet"

basis. In comparison with older methods, such as the Orsat apparatus, which provides an analysis on a "dry" gas basis, the "wet" analysis will, in general, indicate a lower percentage of oxygen. The difference will be proportional to the water content of the sampled gas stream.

- c. **System Configuration.** The equipment discussed in this manual consists of three major components: the oxygen analyzer (CENELEC approved) (probe), the intelligent field transmitter (CENELEC approved) (IFT), and an optional heater power supply (CENELEC approved) (HPS). The HPS is required when the cable run between the electronics and the probe exceeds 45 m (150 ft). There is also an optional multiprobe test gas sequencer (MPS), which can be used to facilitate the automatic calibration of a multiple probe configuration.

CENELEC approved probes are available in three length options, giving the user the flexibility to use an in situ penetration appropriate to the size of the stack or duct. The options on length are 457 mm (18 in.), 0.91 m (3 ft), and 1.83 m (6 ft). The probe is certified EExd IIB T1 [370°C (698°F)] to CENELEC standards EN50014 and EN50018.

The IFT contains electronics that control probe temperature (in conjunction with the optional HPS) and supply power, and provide isolated outputs that are proportional to the measured oxygen concentration. The oxygen sensing cell is maintained at a constant temperature by modulating the duty cycle of the probe heater. The IFT accepts millivolt signals generated by the sensing cell and produces outputs to be used by remotely connected devices. The IFT output is isolated and selectable to provide linearized voltage or current.

The heater power supply CENELEC approved (HPS) can provide an interface between the IFT and the probe. The HPS contains a transformer for supplying proper voltage to the probe heater. The unit is certified EExd IIC T6 to CENELEC standards EN50014 and EN50018.

Systems with multiprobe and multiple IFT applications may employ an optional MPS 3000 Multiprobe Test Gas Sequencer. The MPS 3000 provides automatic test gas sequencing for up to four probes and IFTs to accommodate automatic calibration. The MPS 3000 must be installed in a non-hazardous, explosive-free environment.

d. System Features.

1. Unique and patented electronic cell protection action that automatically protects sensor cell when the analyzer detects reducing atmospheres.
2. Output voltage and sensitivity increase as the oxygen concentration decreases.
3. User friendly, menu driven operator interface with context-sensitive on-line help.
4. Field replaceable cell.
5. Analyzer constructed of rugged 316 LSS for all wetted parts.
6. The intelligent field transmitter (IFT) can be located up to 45 m (150 ft) from the probe when used without optional heater power supply (HPS). When the system includes the optional HPS, the HPS can be located up to 45 m (150 ft) from the probe and the IFT may be located up to 364 m (1200 ft) from the HPS.
7. All electronic modules are adaptable to 120, 220, and 240 line voltages.
8. Five languages may be selected for use with the IFT. These are:
 - English
 - French
 - German
 - Italian
 - Spanish
9. An operator can set up, calibrate, or troubleshoot the IFT in one of two ways:
 - (a) Optional General User Interface (GUI). The GUI is housed within the IFT electronics enclosure and makes use of an LCD display and keypad.
 - (b) Optional LED Display Panel (LDP). The LED display and a limited function keypad permit calibration only.

e. Handling the Oxygen Analyzer.

CAUTION

It is important that printed circuit boards and integrated circuits are handled only when adequate antistatic precautions have been taken to prevent possible equipment damage.

The oxygen analyzer is designed for industrial application. Treat each component of the system with care to avoid physical damage. The probe contains components made from ceramics, which are susceptible to shock when mishandled. See Safety Data Sheets 1M03243, 1M03226, and 1M03296 for safety related information.

NOTE

Retain packaging in which the oxygen analyzer arrived from the factory in case any components are to be shipped to another site. This packaging has been designed to protect the product.

- f. System Considerations.** Prior to installation of your Rosemount CENELEC approved World Class 3000 Oxygen Analyzer with Intelligent Field Transmitter make sure that you have all of the components necessary to make the system installation. Ensure that all the components are properly integrated to make the system functional.

Once you have verified that you have all the components, select mounting locations and determine how each component will be placed in terms of available power supply, ambient temperatures, environmental considerations, convenience, and serviceability. A typical system installation is illustrated in Figure 1-2. Figure 1-3 shows a typical system wiring. For details on installing the individual components of the system, refer to Section II, Installation.

After selecting the probe mounting location, provision should be made for a platform where the probe can be easily serviced. The intelligent field transmitter (IFT) can be located up to 45 m (150 ft) cabling distance from the probe when used without optional heater power supply (HPS). When the system includes the optional HPS, the HPS can be located up to 45 m (150 ft) cabling distance from the probe and the IFT may be located up to 364 m (1200 ft) cabling distance from the HPS.

A source of instrument air is required at the probe for reference gas use. Since the probe is

equipped with an in-place calibration feature, provision should be made for connecting test gas tanks to the oxygen analyzer when the probe is to be calibrated.

If the test gas bottles will be permanently hooked up, a check valve must be connected to the calibration gas fitting on the probe junction box. This is to prevent breathing of calibration gas line and subsequent gas condensation and corrosion. The check valve is in addition to the stop valve in the test gas kit or the solenoid valve in the multiprobe test gas sequencer units.

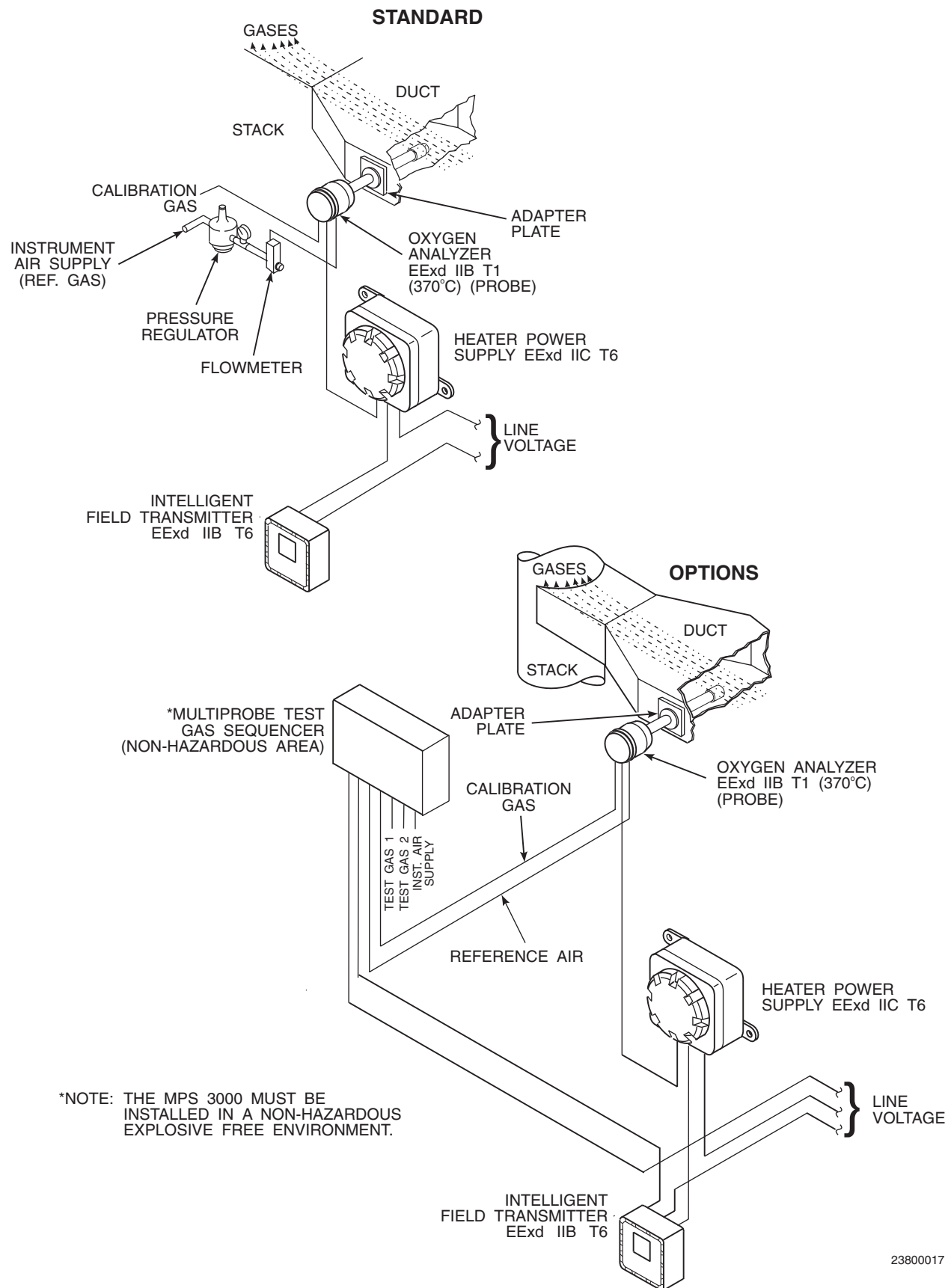
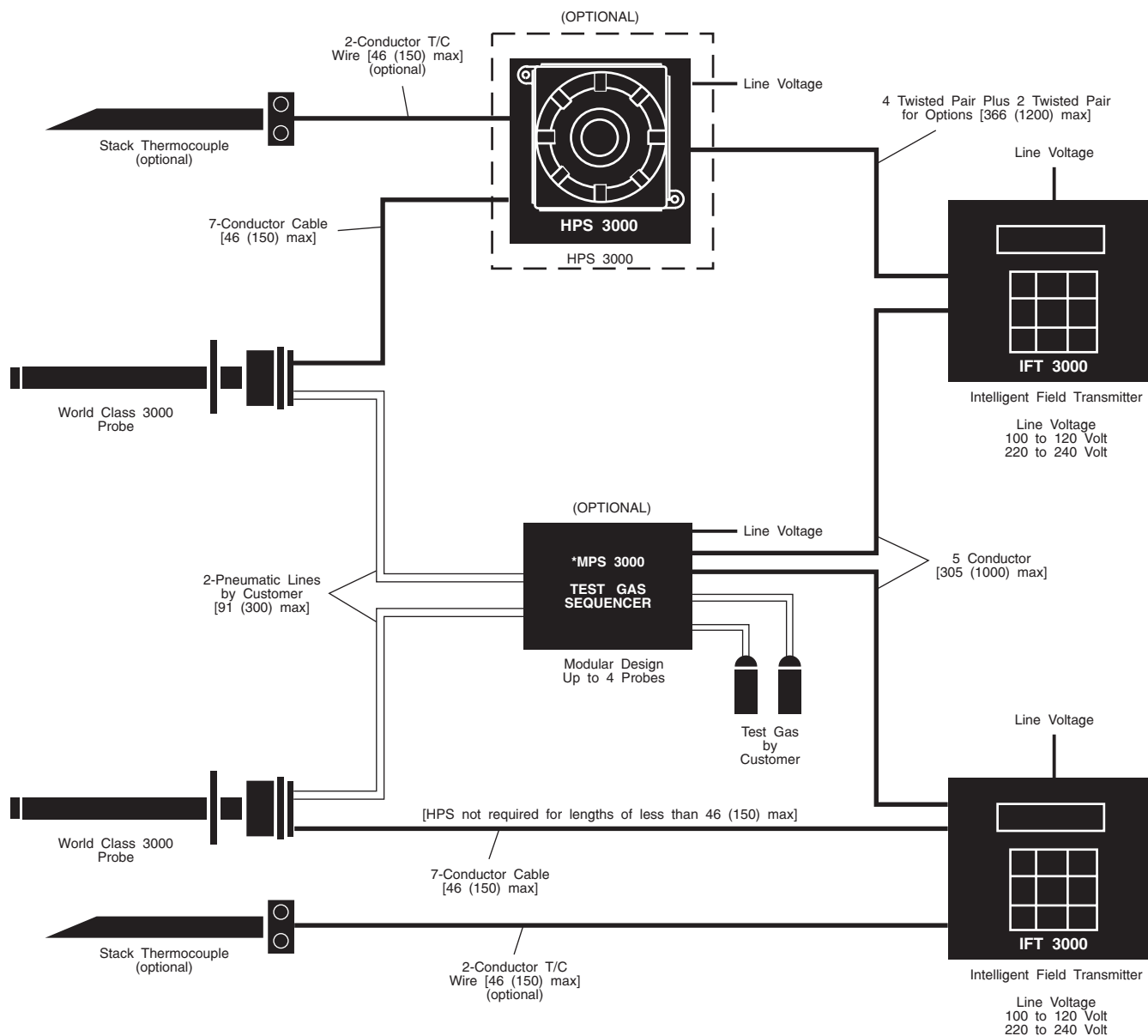


Figure 1-2. Typical System Installation



*NOTE 1: THE MPS 3000 MUST BE INSTALLED IN A NON-HAZARDOUS EXPLOSIVE FREE ENVIRONMENT.

NOTE 2: ALL DIMENSIONS APPEAR IN METERS WITH FEET IN PARENTHESES.

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**Figure 1-3. World Class 3000 Typical Application
with Intelligent Field Transmitters - CENELEC Approved**

SECTION II. INSTALLATION

2-1. OXYGEN ANALYZER (PROBE) INSTALLATION.

WARNING

Before probe installations, consult probe Safety Data Sheet 1M03226.

WARNING

The probe and probe abrasive shield are heavy. Use proper lifting and carrying procedures to avoid personnel injury.

WARNING

Install all protective equipment covers and safety ground leads after installation. Failure to install covers and ground leads could result in serious injury or death.

2. Check the flue or stack for holes and air leakage. The presence of this condition will substantially affect the accuracy of the oxygen reading. Therefore, either make necessary repairs or install the probe upstream of any leakage.
3. Ensure that the area is clear of obstructions internal and external that will interfere with installation. Allow adequate clearance for removal of probe (Figure 2-1).

CAUTION

Do not allow the temperature of the probe junction box to exceed 150°C (302°F) or damage to the unit may result. If the probe junction box temperature exceeds 150°C (302°F), the user must fabricate a heat shield or provide adequate cooling air to the probe junction box.

a. Selecting Location.

1. The location of the probe in the stack or flue is most important for maximum accuracy in the oxygen analyzing process. The probe must be positioned so that the gas it measures is representative of the process. Best results are normally obtained if the probe is positioned near the center of the duct (40 to 60% insertion). A point too near the edge or wall of the duct may not provide a representative sample because of the possibility of gas stratification. In addition, the sensing point should be selected so that the process gas temperature falls within a range of 10° to 704°C (50° to 1300°F). Figure 2-1 provides you with mechanical installation references.

b. Mechanical Installation.

1. Ensure that all components are available for installation of the probe. Check the ceramic filter to ensure that it is not damaged and that the system cable is the required length.
2. The probe may be installed intact as it is received. It is recommended that you disassemble the adapter plate for each installation.
3. Weld or bolt adapter plate (Figure 2-1) onto the duct.

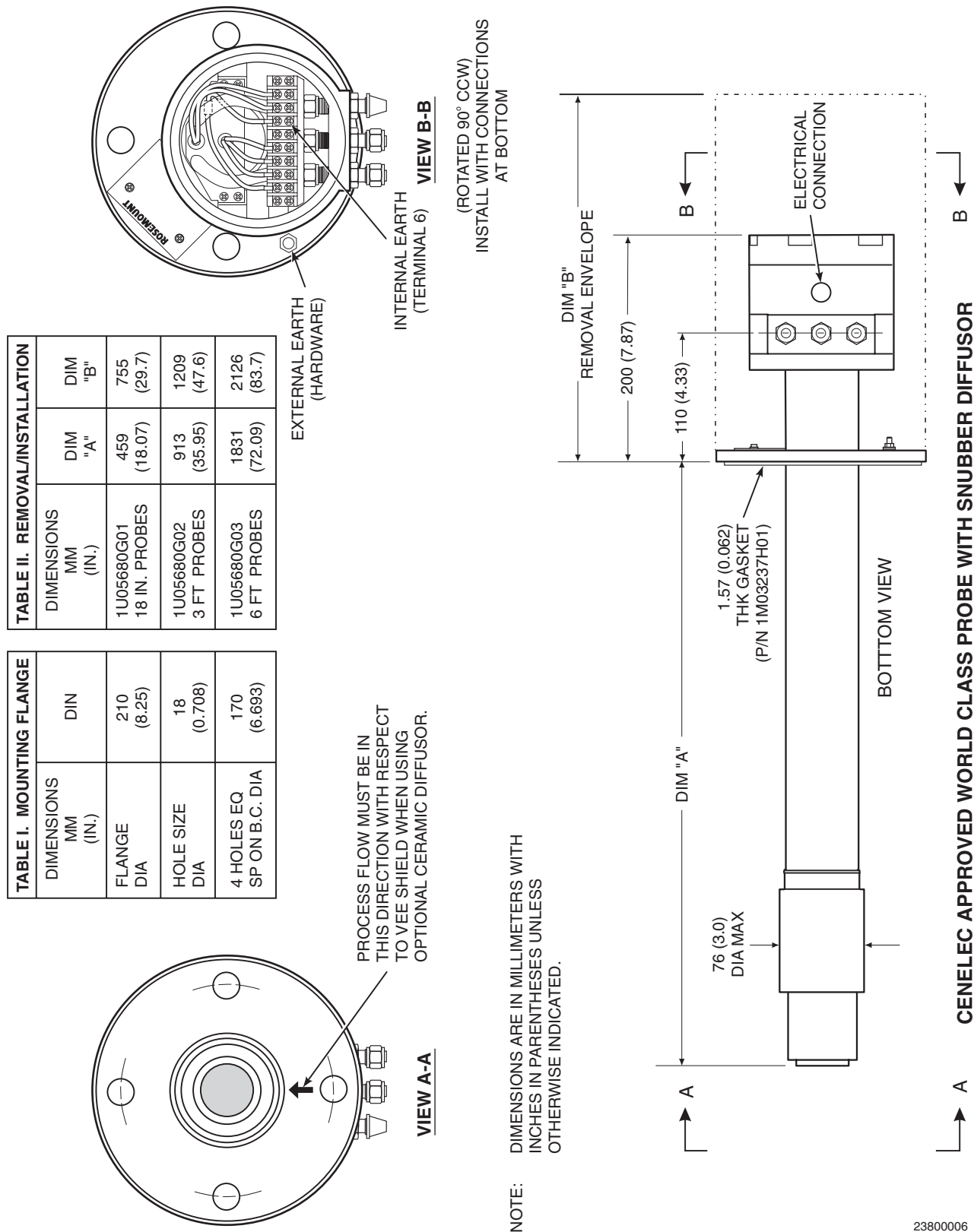


Figure 2-1. Probe Installation (Sheet 1 of 5)

REMOVAL/INSTALLATION			
DIMENSIONS MM (IN.)	DIM "C"	DIM "D" (REMOVAL ENVELOPE)	
18 IN. PROBE 1U05680G04 SHIELD 1N04966H01	387 (15.3)	769 (30.3)	
3 FT PROBE 1U05680G05 SHIELD 1N04966H02	843 (33.2)	1224 (48.2)	
6 FT PROBE 1U05680G06 SHIELD 1N04966H03	1762 (69.4)	2144 (84.4)	

NOTE: DIMENSIONS ARE IN MILLIMETERS
WITH INCHES IN PARENTHESES
UNLESS OTHERWISE INDICATED.

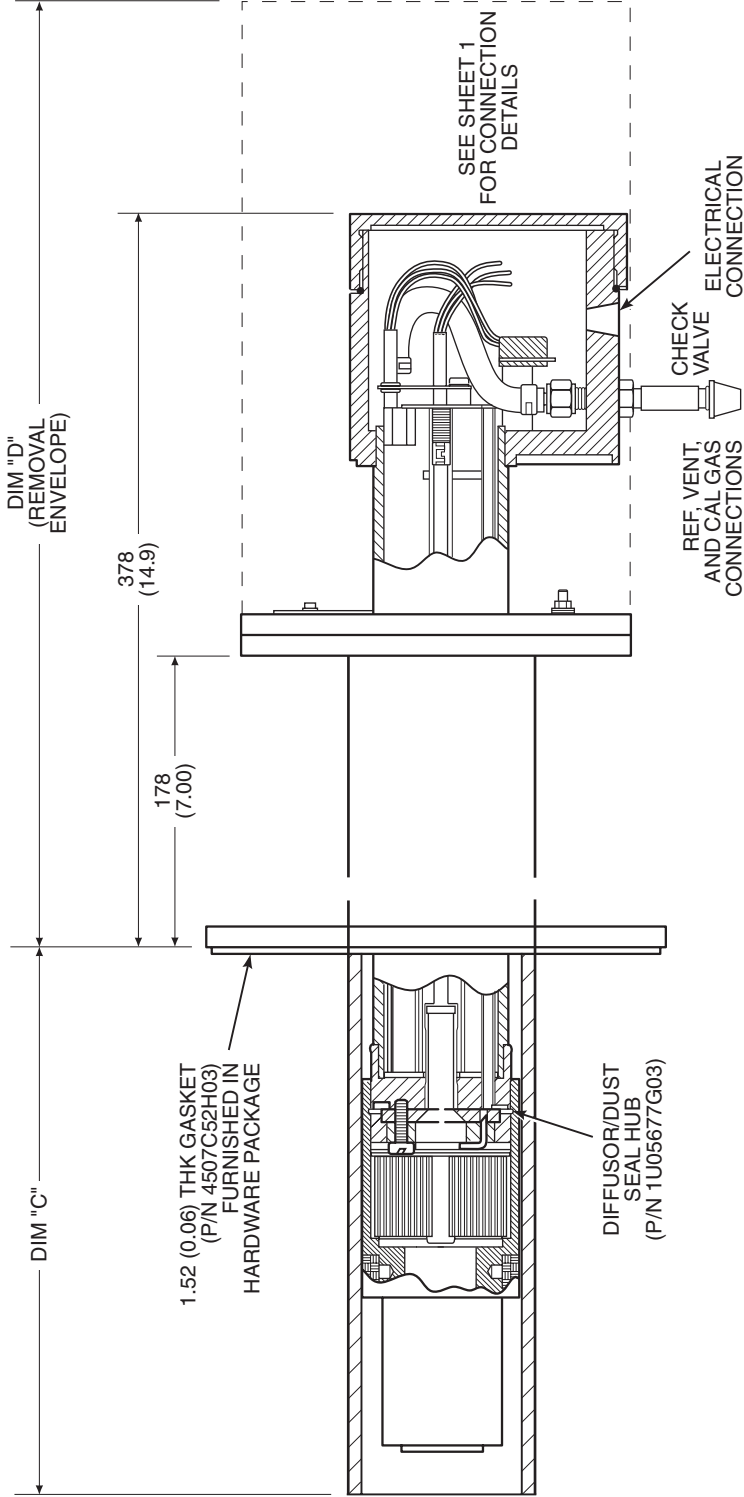


Figure 2-1. Probe Installation (Sheet 2 of 5)

ABRASIVE SHIELD INSTALLATION WITH CENELEC APPROVED WORLD CLASS 3000

23800007

TABLE I. MOUNTING FLANGE		
DIMENSIONS MM (IN.)	DIN	
FLANGE DIA	210 (8.25)	
HOLE SIZE DIA	18 (0.708)	
4 HOLES EQ SP ON B.C. DIA	170 (6.693)	

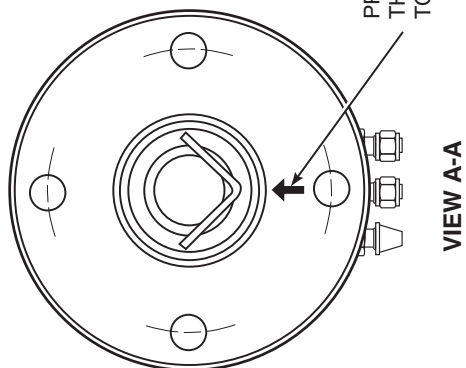
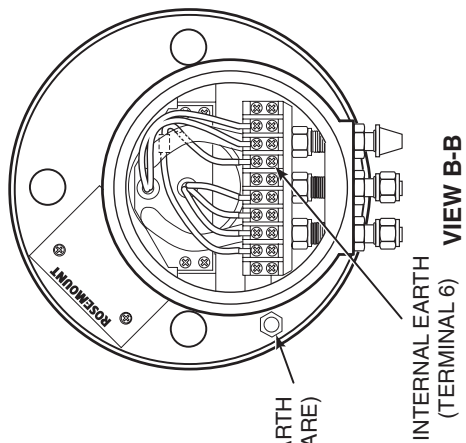
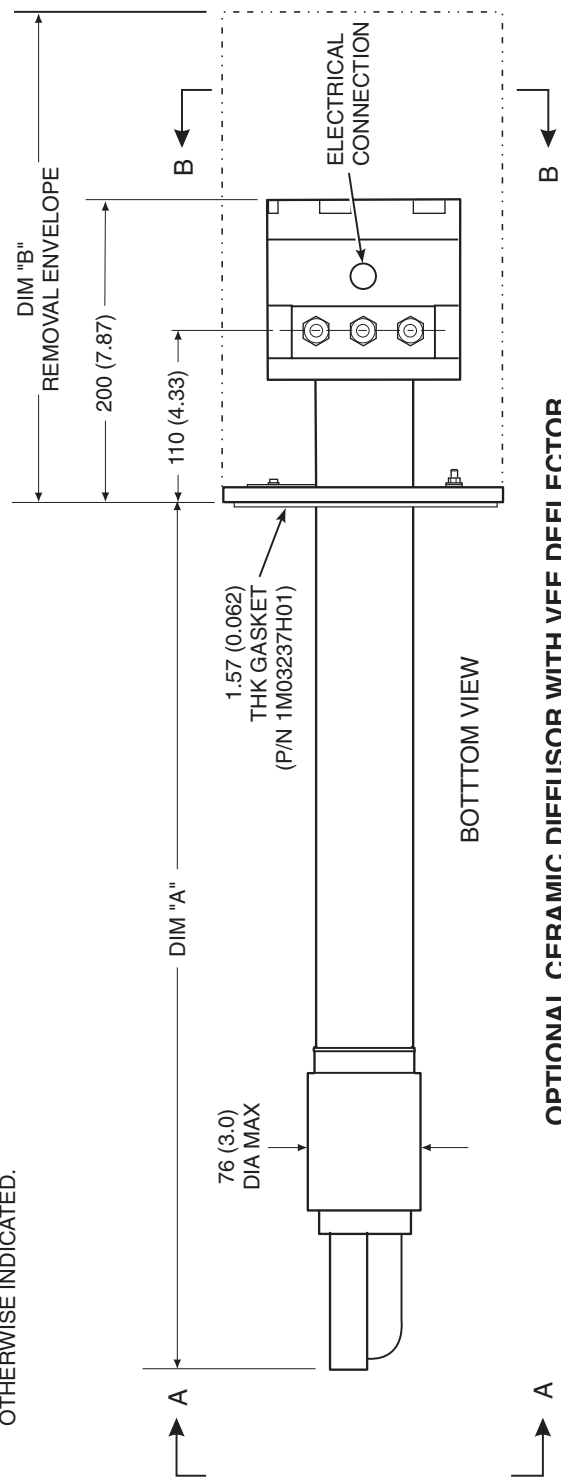


TABLE II. REMOVAL/INSTALLATION			
DIMENSIONS MM (IN.)	DIM "A"	DIM "B"	
1U05680G01 18 IN. PROBES	554 (21.81)	755 (29.7)	
1U05680G02 3 FT PROBES	1008 (39.68)	1209 (47.6)	
1U05680G03 6 FT PROBES	1926 (75.83)	2126 (83.7)	



(ROTATED 90° CCW)
INSTALL WITH CONNECTIONS
AT BOTTOM

NOTE: DIMENSIONS ARE IN MILLIMETERS WITH
INCHES IN PARENTHESES UNLESS
OTHERWISE INDICATED.



OPTIONAL CERAMIC DIFFUSOR WITH VEE DEFLECTOR

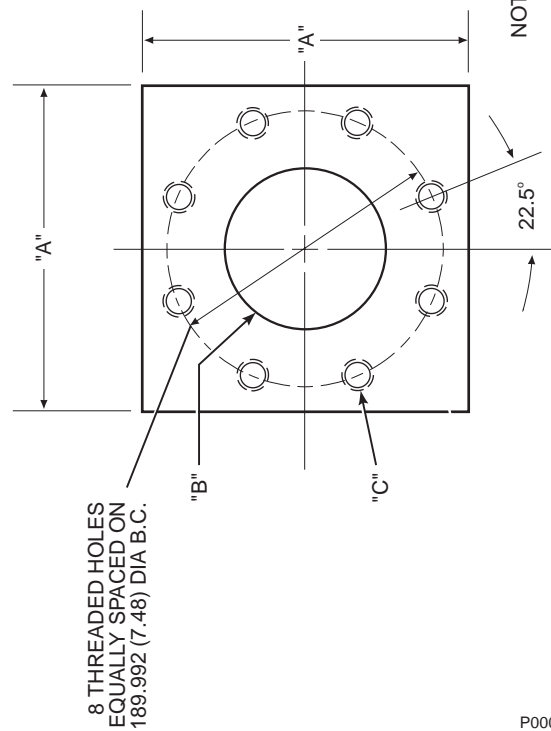
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Figure 2-1. Probe Installation (Sheet 3 of 5)

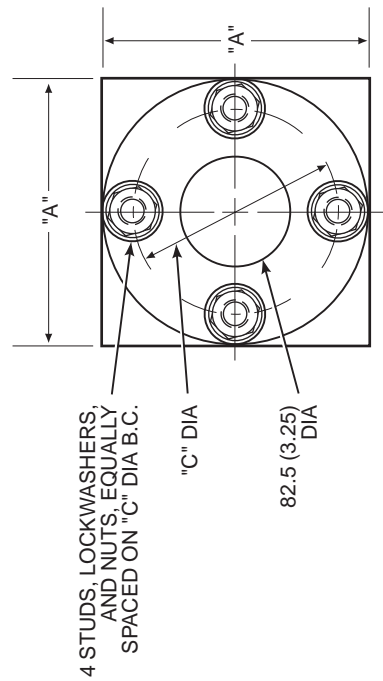
MOUNTING PLATE OUTLINE

TABLE III. MOUNTING PLATE: ABRASIVE SHIELD TO STACK (NEW INSTALLATIONS)			TABLE IV. MOUNTING PLATE: PROBE TO STACK (NEW INSTALLATIONS)		
DIMENSIONS MM (IN.)		DIN	DIMENSIONS MM (IN.)		DIN
"A"		235 (9.25)	"A"		215 (8.5)
"B" DIA		100 (3.94)	"B" THREAD		M-16 x 2
"C" THREAD		M-20 x 2.5	"C" DIA		170 (6.7)

MOUNTING PLATE FOR
18 IN., 3 FT AND 6 FT
ABRASIVE SHIELD INSTALLATIONS
SEE SHEET 2.



MOUNTING PLATE FOR
CENELEC WORLD CLASS 3000
PROBE INSTALLATIONS
SEE SHEET 1.

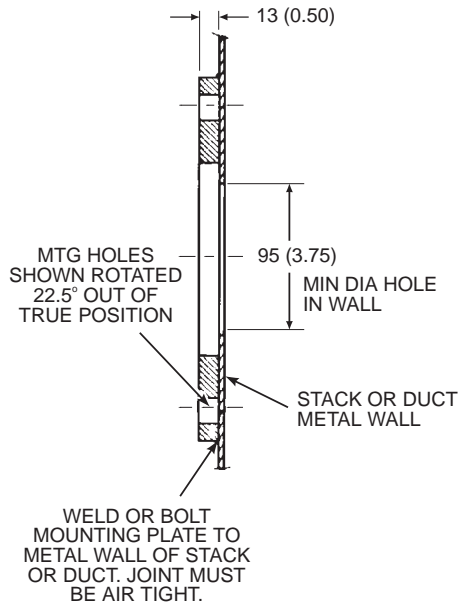


NOTE: DIMENSIONS ARE IN MILLIMETERS
WITH INCHES IN PARENTHESES
UNLESS OTHERWISE INDICATED.

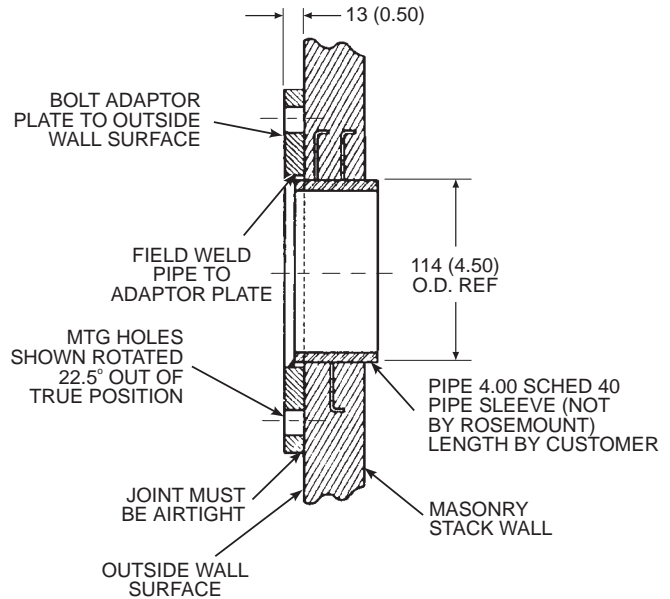
P00006

Figure 2-1. Probe Installation (Sheet 4 of 5)

INSTALLATION FOR METAL WALL STACK OR DUCT CONSTRUCTION

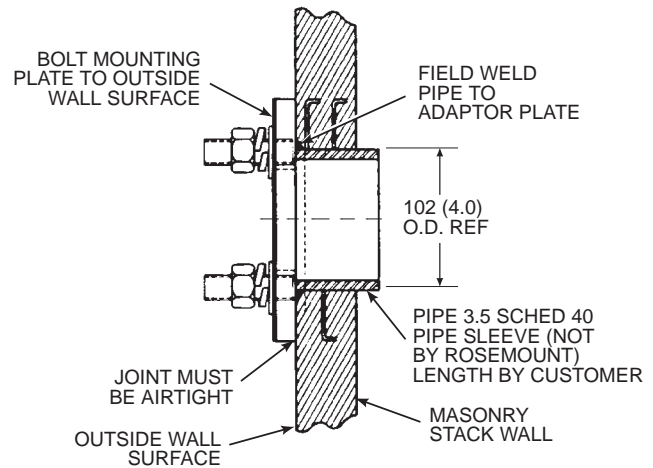
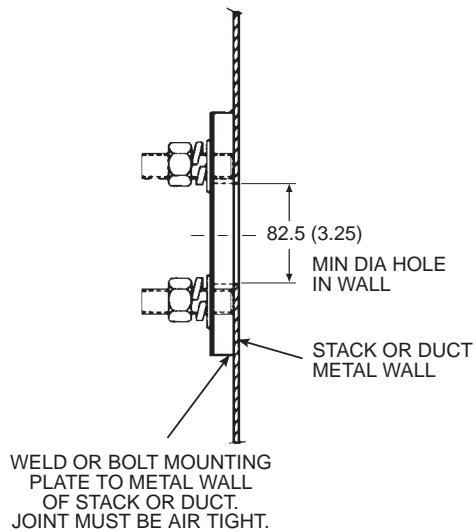


INSTALLATION FOR MASONRY WALL STACK CONSTRUCTION



NOTE: ALL MASONRY STACK WORK AND JOINTS EXCEPT MOUNTING PLATE NOT FURNISHED BY ROSEMOUNT.

ABRASIVE SHIELD MOUNTING



PROBE MOUNTING

P00007

Figure 2-1. Probe Installation (Sheet 5 of 5)

4. If using the optional ceramic diffuser element, the vee deflector must be correctly oriented. Before inserting the probe, check the direction of flow of the gas in the duct. Orient the vee deflector on the probe so that the apex points upstream toward the flow (Figure 2-2). This may be done by loosening the setscrews, and rotating the vee deflector to the desired position. Retighten the setscrews.
5. In horizontal installations, the probe cover should be oriented so that the system cable drops vertically from the probe cover. In a vertical installation, the system cable can be oriented in any direction.
6. If the system has an abrasive shield, check the diffusion element dust seal packings. The joints in the two packings must be staggered 180°. Also, make sure that the packings are in the hub grooves as the probe slides into the 15° forcing cone in the abrasive shield.

NOTE

If process temperatures will exceed 1000°F (538°C), use anti-seize compound on stud threads to ease future removal of probe.

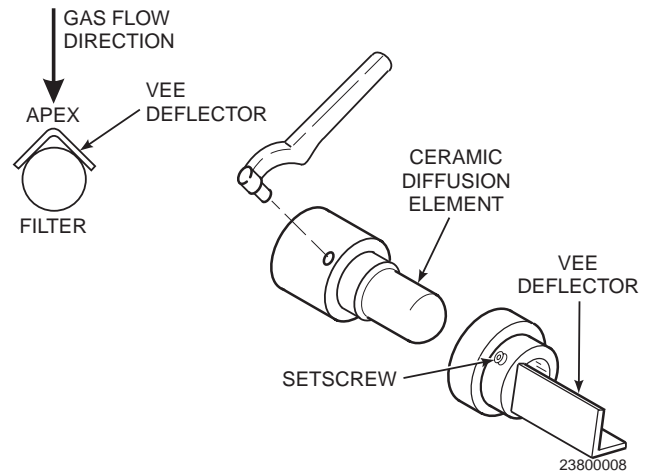


Figure 2-2. Orienting the Optional Vee Deflector

7. Insert the probe through the opening in the mounting flange and bolt the unit to the flange.
8. Ensure that probe is properly earthed by way of both the internal and external points.
9. Ensure that the installation does not obscure the messages on either the probe nameplate or the junction box lid.

- c. **Reference Air Package.** After the oxygen analyzing (probe) unit is installed, connect the reference gas air set to the probe cover. The reference gas air set should be installed in accordance with Figure 2-3.

d. **Service Required.**

1. Power input: 44 VAC from HPS 3000 or IFT 3000.
2. Compressed air: 68.95 kPa (10 psig) minimum, 1551.38 kPa (225 psig) maximum at 56.6 L/hr (2 scfh) maximum; supplied by one of the following (less than 40 parts-per-million total hydrocarbons).
 - (a) Instrument air - clean, dry.
 - (b) Bottled standard air with step-down regulator.
 - (c) Bottled compressed gas mixture (20.95% oxygen in nitrogen).
 - (d) Other equivalent clean, dry, oil-free air supply.

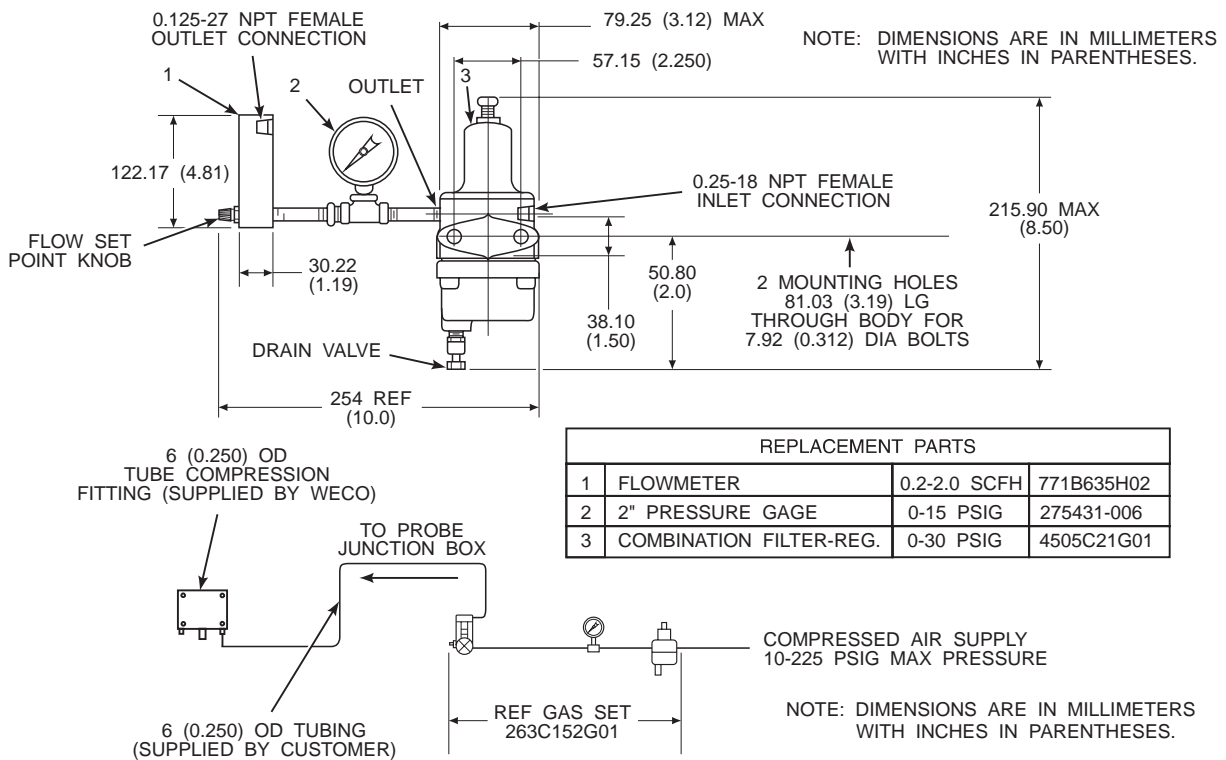
2-2. **INTELLIGENT FIELD TRANSMITTER (IFT) INSTALLATION.**

WARNING

The Rosemount Encode Sheet (Product Ordering Matrix) allows a customer to order either the hazardous area version of the IFT 3000 or the non-hazardous area version. The hazardous area version has the symbol "EExd" on the apparatus nameplate. The non-hazardous area version does not. Ensure that if you have the non-hazardous area version that you do not install it in a potentially explosive environment. This warning applies equally to the hazardous area and non-hazardous area versions of the HPS 3000.

WARNING

Before IFT 3000 Installation, consult Safety Data Sheet 1M03296.



SCHEMATIC HOOKUP FOR REFERENCE AIR SUPPLY ON OXYGEN ANALYZER PROBE HEAD.

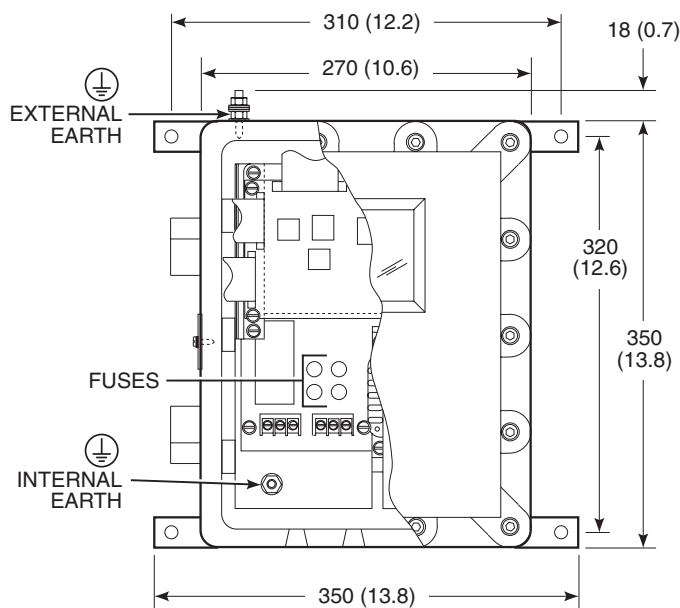
17300016

Figure 2-3. Air Set, Plant Air Connection

WARNING

The IFT 3000 is heavy. Lifting and carrying procedures should take account of this weight.

- a. **Mechanical Installation.** The outline drawing of the IFT module (CENELEC approved) in Figure 2-4 shows mounting centers and clearances. The enclosure is designed to be mounted on a wall. The IFT should be installed no more than 364 m (1200 ft) from the optional HPS or 45 m (150 ft) from the probe if HPS is not installed in the system. Ambient temperature must be between 0°C and 50°C (32°F and 122°F).
- b. **Electrical Connections.**
1. The IFT can be configured for 100, 120, 220, or 240 line voltages. For 120 Vac usage,



NOTES: ALL DIMENSIONS ARE IN MILLIMETERS WITH INCHES IN PARENTHESES UNLESS OTHERWISE INDICATED.

FUSES SHOWN (F3 THROUGH F6) ARE 5 AMP, ANTI-SURGE, TYPE T TO IEC127 (ROSEMOUNT PART NUMBER 1L01293H02). IF INTERNAL HEATER IS INSTALLED, TWO ADDITIONAL 5 AMP FUSES (F1 AND F2) ARE USED.

install JM8, JM7, and JM1. For 220 Vac usage, install jumpers JM6, JM5, JM2 (refer to Figures 2-5 and 2-6).

CAUTION

If you reconfigure the equipment for a line voltage other than the one marked on the serial label and the mains filter of the power supply you should change the marking on the serial label and the mains filter to state the new line voltage.

NOTE

Fuse specifications are included in Figure 2-4.

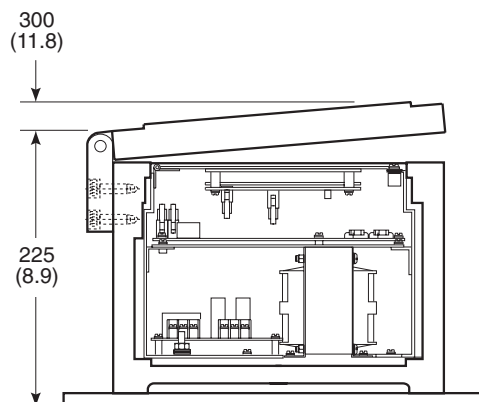



Figure 2-4. Outline of Intelligent Field Transmitter

		JUMPER CONFIGURATION		ALWAYS DISCONNECT LINE VOLTAGE FROM INTELLIGENT FIELD TRANSMITTER BEFORE CHANGING JUMPERS.	
LINE VOLTAGE SELECTION	JUMPER (INSTALL)	PROBE HEATER VOLTAGE SELECTION	JUMPER (INSTALL)		
120 V.A.C.	JM8, JM7, JM1	WORLD CLASS PROBE (44V)	JM10		
220 V.A.C.	JM6, JM5, JM2				
240 V.A.C.	JM6, JM5, JM1				

P00010

CAUTION

If you reconfigure the equipment for a line voltage other than the one marked on the serial label and the mains filter of the power supply then you should change the marking on the serial label and the mains filter to state the new line voltage.

CAUTION

If incorrect heater voltage is selected, damage to the probe may occur. For HPS voltage selection jumper, refer to Figure 2-15.

Figure 2-5. Power Supply Board Jumper Configuration

- The IFT can be configured to connect directly to a probe or to an optional HPS. The electrical connections for a non-HPS equipped system should be made as described in the electrical installation diagram, Figure 2-7.

CAUTION

Do not install jumper JM6 on the microprocessor board, or JM1 on the interconnect board, if an HPS is installed in the system. This will result in system failure.

- The IFT must have JM6 on the microprocessor board (Figures 2-8 and 2-9) and JM1 on the interconnect board (Figures 2-10 and 2-11) installed if an HPS is not installed in the system.
- If an MPS is not used in the system, wire jumper between CAL RET and NO GAS

must be installed on the interconnect board. Remove wire jumper if MPS is installed in the system. Refer to Figure 2-7, note 6.

- The power cable should comply with the safety regulations in the user's country and should not be smaller than 16 gauge, 3 amp.
- Before supplying power to the IFT, verify that the jumpers have been properly set in the IFT, Figures 2-5, 2-8, and 2-10.
- Terminal strip J5 on the power supply board is used for supplying the IFT with power. Terminal strip J6 on the power supply board is used to supply the probe heater with power if an HPS is not used (Figure 2-6).
- Ensure that the IFT 3000 is properly earthed by way of both the internal and external earthing hardware.
- Ensure that the installation does not obscure the message on either the IFT nameplate or the IFT lid.

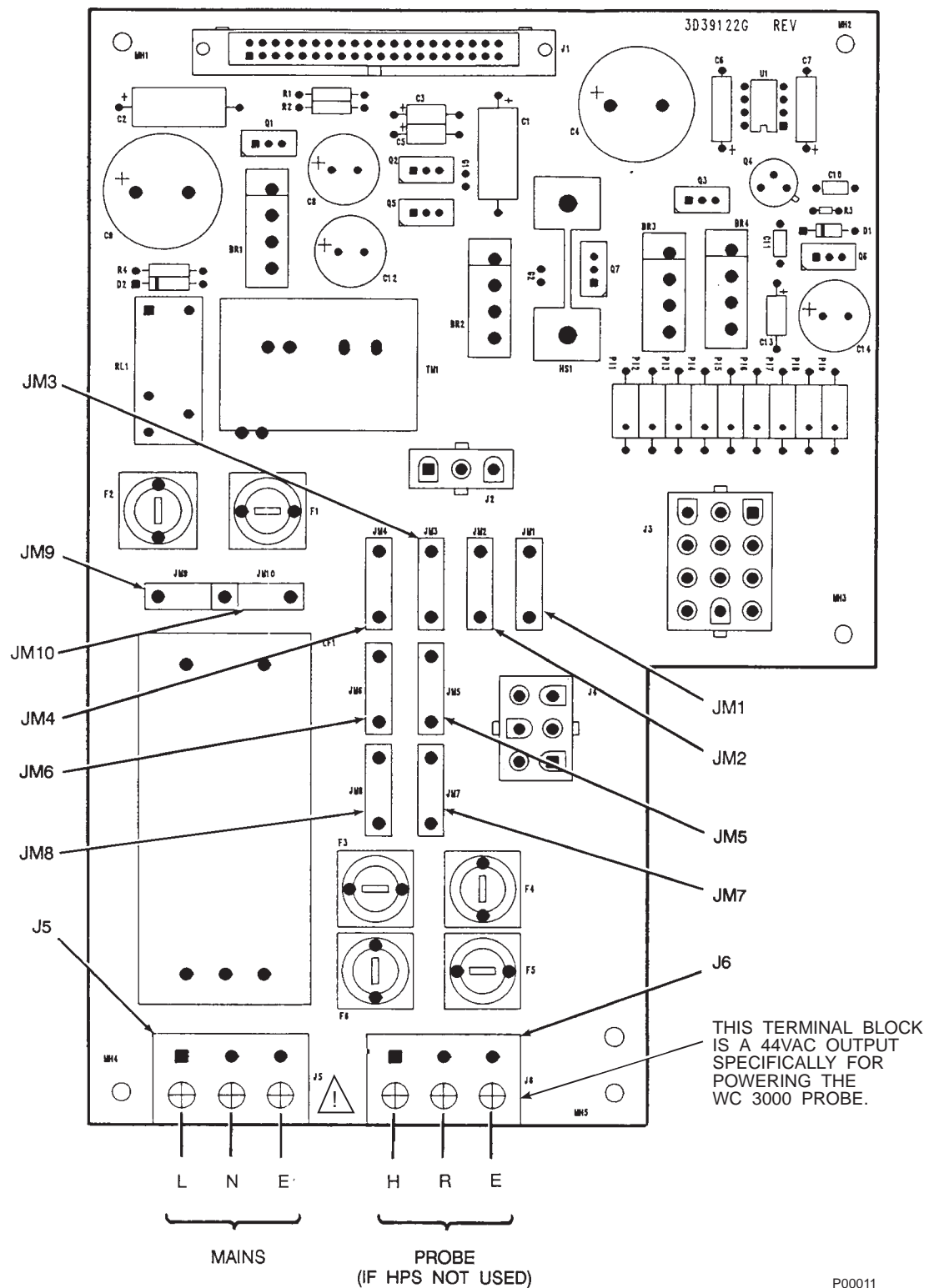


Figure 2-6. IFT Power Supply Board Jumpers

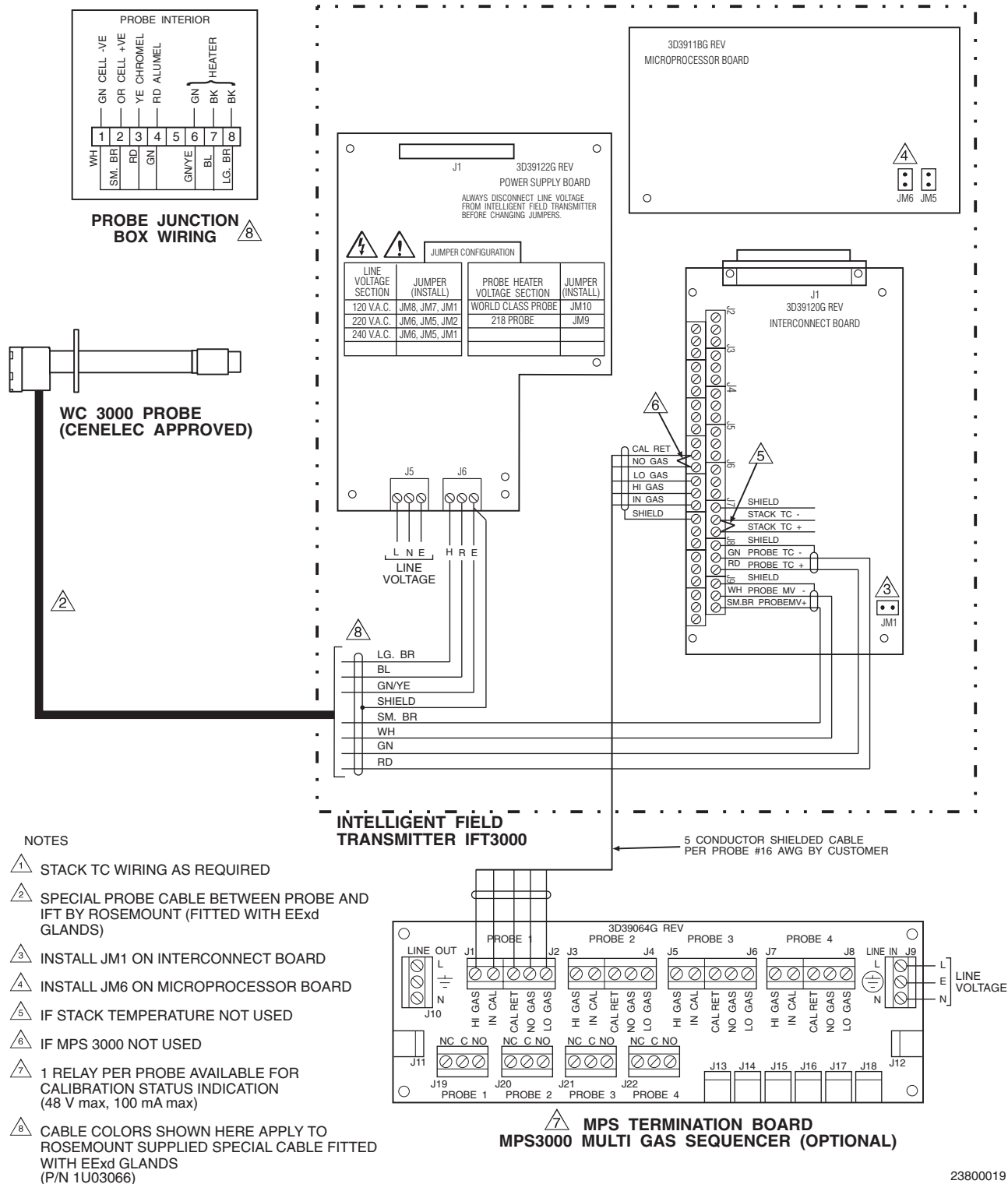


Figure 2-7. Wiring Layout for IFT 3000 (CENELEC approved) System without HPS

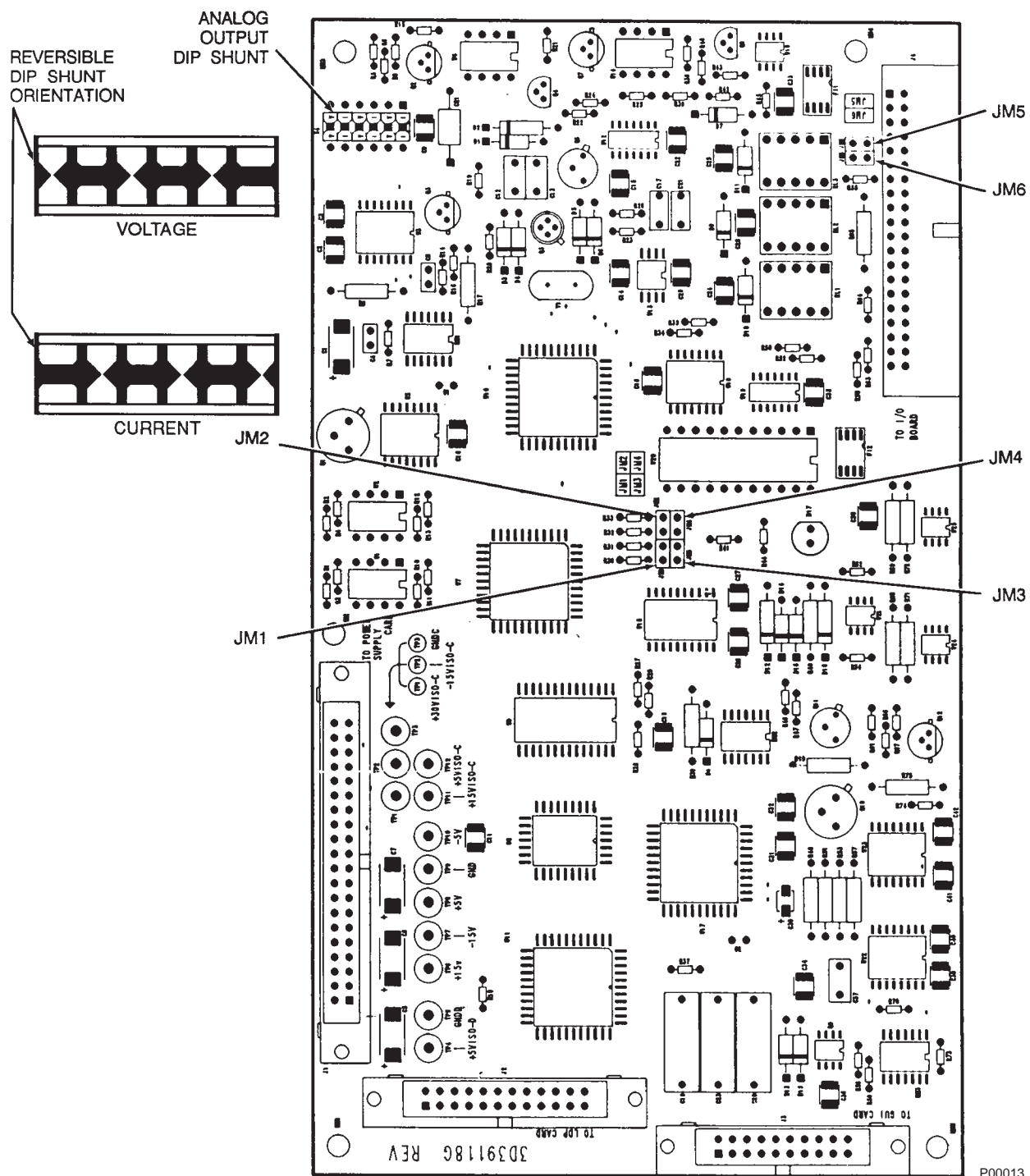


Figure 2-8. IFT Microprocessor Board Jumper Configuration

c. **Analog Output and Relay Output Connections.**

1. The microprocessor board has a socket for a dip shunt to select voltage or current operations. Figure 2-8 shows the dip shunt orientation. In voltage mode, output is 0-10 V. In the current mode, the output can be configured from the setup menu to be 0-20 mA or 4-20 mA.
2. The analog output and relay outputs are programmed by the user as needed. The analog output is typically sent to recording equipment such as chart recorders. Relay outputs are typically sent to annunciators.
3. Relays K1 and K2 are user configurable from the PROBE SETUP sub-menu (Table 3-5). Typically these are used to indicate O₂ values above or below specified tolerances. OK relay is energized when unit is functioning properly.
4. All wiring must conform to local and national codes.

BIT BUS ADDRESS	JUMPER
(Not Used)	JM1, JM2, JM3, JM4
BIT BUS	JUMPER
Resistor Terminated Resistor Not Terminated	Install JM5 Remove JM5
OUTPUT	JUMPER
HPS Probe (No HPS)	Remove JM6 Install JM6

(See Figure 2-8 for jumper locations.)

Figure 2-9. IFT Microprocessor Board Jumpers

OUTPUT	JUMPER
HPS Probe (No HPS)	Remove JM1 Install JM1

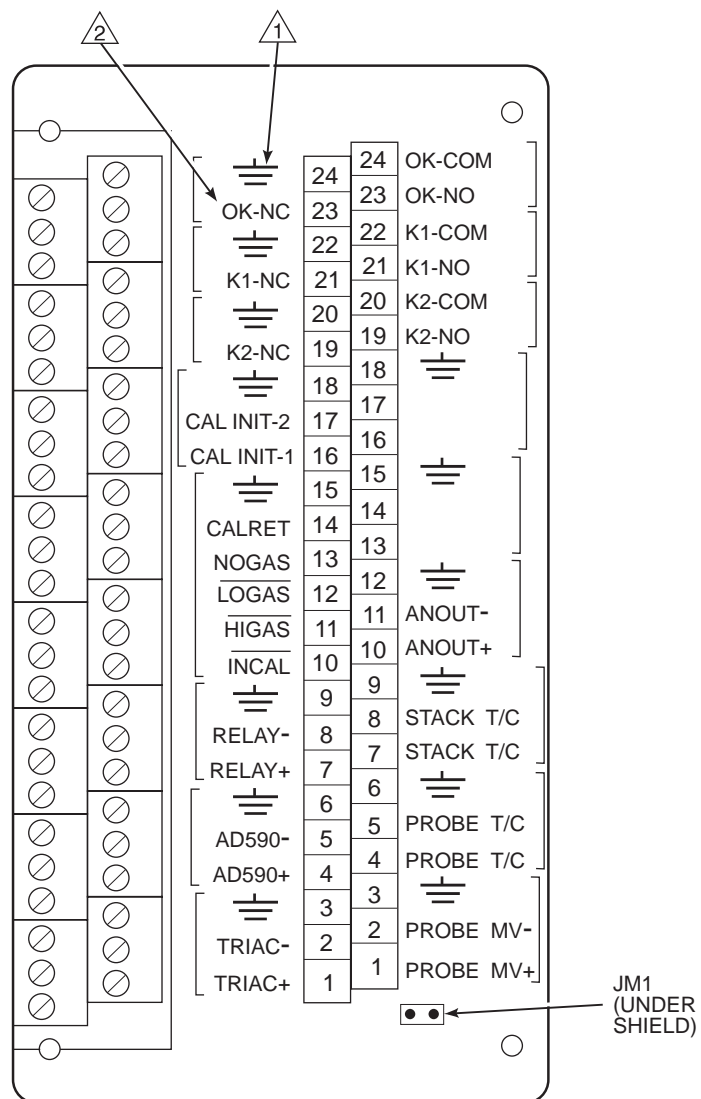
Figure 2-10. Interconnect Board Jumper Configuration

5. Connect the analog output and relay outputs as shown in Figure 2-11.

NOTES:

① ≡ DENOTES SHIELD CONNECTION.

② OK RELAY IS ENERGIZED WHEN UNIT IS FUNCTIONING PROPERLY.



730002

Figure 2-11. IFT Interconnect Board Output Connections

2-3. HEATER POWER SUPPLY INSTALLATION.

WARNING

The Rosemount encode sheets (Product Ordering Matrix) allow a customer to order either the hazardous area version of the HPS 3000 or the non-hazardous area version. The hazardous area version has the symbol "EExd" on the apparatus nameplate. The non-hazardous area version does not. Ensure that if you have received the non-hazardous version that you do not install it in a potentially explosive atmosphere. This also applies to the hazardous/non-hazardous version of the IFT 3000.

WARNING

Before HPS installation, consult Safety Data Sheet 1M03243.

- a. **Mechanical Installation.** The outline drawing of the CENELEC approved heater power supply enclosure in Figure 2-12, shows mounting centers and clearances. The CENELEC approved enclosure is designed to be mounted on a wall or bulkhead. The heater power supply should be installed no further than 45 m (150 ft) from the probe. The heater power supply must be located in a location free from significant ambient temperature changes and electrical noise. Ambient temperature must be between 0° to 60 °C (32° to 140 °F).

b. **Electrical Connections.**

1. Electrical connections should be made as described in the electrical installation diagram, Figure 2-13. The wiring terminals are divided into two layers: the bottom (FROM PROBE) terminals should be connected first, the top (FROM ELECTRONICS) terminals should be connected last (Figure 2-14). Each terminal strip has a protective cover which must be removed when making connections. To remove the terminal covers, remove two slotted screws holding cover in place. Always reinstall terminal covers after making connections.

2. Power Input: 120, 220 or 240 Vac. For 120 Vac usage, install jumpers JM4 and JM1 and remove JM5 if installed. For 220 or 240 Vac usage, install jumper JM5 and remove JM1 and JM4 if installed (see label, Figure 2-15).

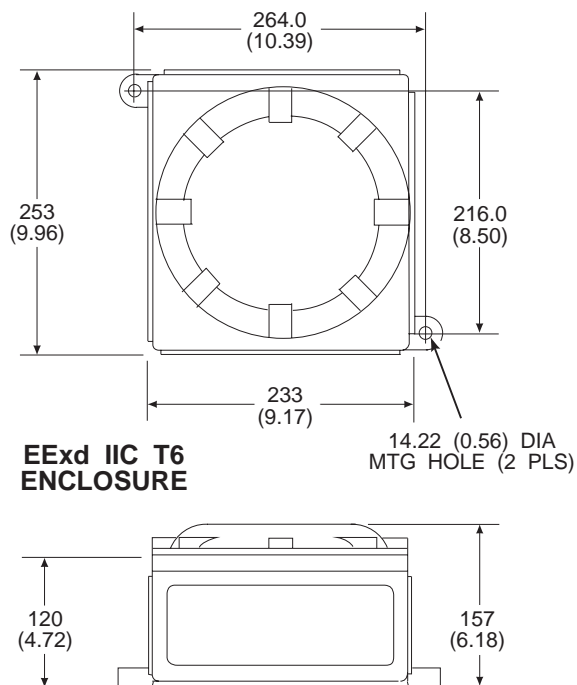
CAUTION

If you reconfigure the equipment for a line voltage other than the one marked on the serial label and the mains filter of the power supply then you should change the marking on the serial label and the mains filter to state the new line voltage.

NOTE

Fuse specifications are shown in Figure 2-14.

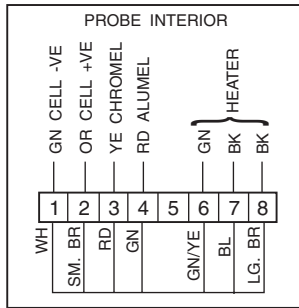
3. The power cable should comply with safety regulations in the user's country and should not be smaller than 16 gauge, 3 amp.



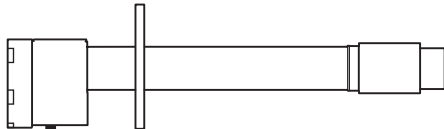
NOTE: DIMENSIONS ARE IN MILLIMETERS
WITH INCHES IN PARENTHESES
UNLESS OTHERWISE INDICATED.

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Figure 2-12. Outline of CENELEC Approved Heater Power Supply



PROBE JUNCTION BOX WIRING

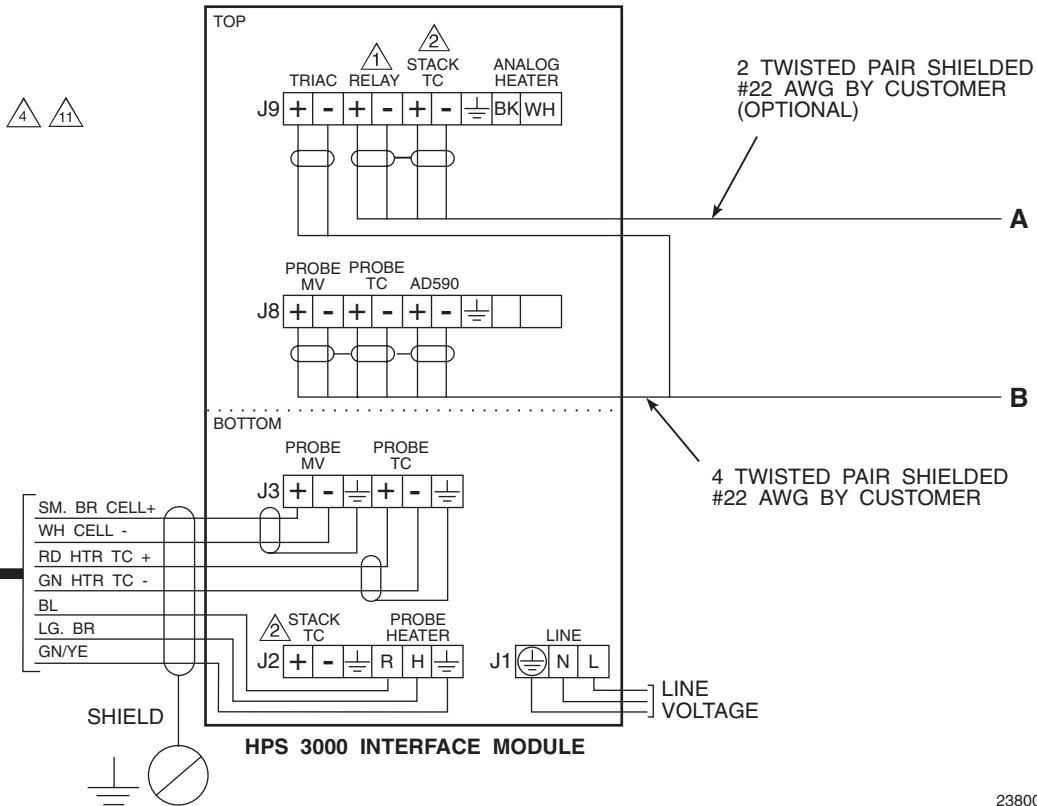


WC PROBE 3000 CENELEC APPROVED

NOTES

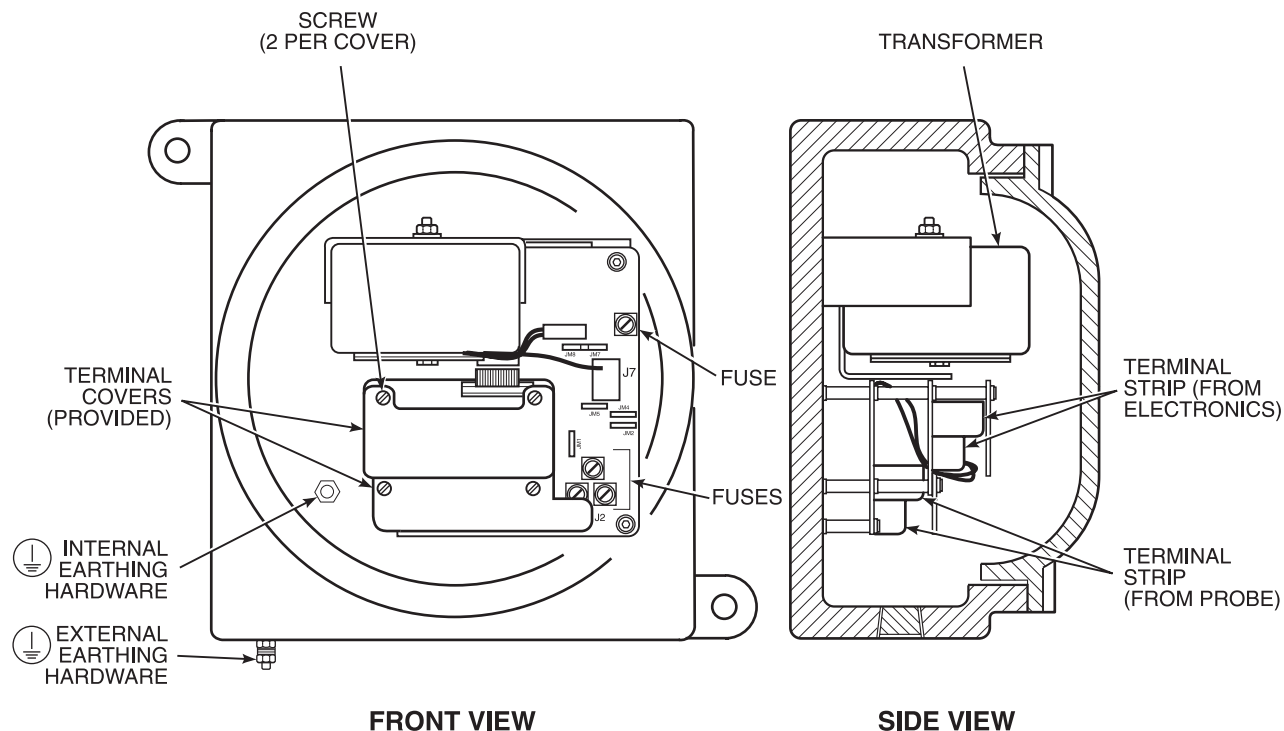
- 1 RELAY WIRE IS OPTIONAL; RELAY CAN BE PERMANENTLY ENABLED WITH JUMPER IF NOT USED
- 2 STACK TC WIRING AS REQUIRED
- 3 ALL WIRES #16-#22 AWG TWISTED PAIR WITH SHIELD BY CUSTOMER EXCEPT AS NOTED
- 4 SPECIAL PROBE CABLE BETWEEN PROBE AND HPS BY ROSEMOUNT
- 5 REMOVE JM1 ON INTERCONNECT BOARD (IFT 3000)
- 6 REMOVE JM6 ON MICROPROCESSOR BOARD
- 7 IF RELAY WIRE OF NOTE 1 INSTALLED THEN REMOVE JM2 ON HPS 3000
- 8 IF STACK TEMPERATURE NOT USED
- 9 IF MPS 3000 NOT USED
- 10 1 RELAY PER PROBE AVAILABLE FOR CALIBRATION STATUS INDICATION (48 V max, 100 mA max)
- 11 CABLE COLORS SHOWN HERE APPLY TO ROSEMOUNT SUPPLIED SPECIAL CABLE FITTED WITH EExd GLANDS (P/N 1U03066)

		ALWAYS DISCONNECT LINE VOLTAGE FROM HEATER POWER SUPPLY AND ANALOG ELECTRONICS (IF USED) BEFORE CHANGING JUMPERS.	
JUMPER CONFIGURATIONS			
LINE VOLTAGE SELECTION	JUMPER (INSTALL)	HEATER POWER	JUMPER
120 V.A.C.	JM4, JM1	REMOTE	REMOVE JM2
220/240 V.A.C.	JM5	ON	INSTALL JM2
PROBE HEATER VOLTAGE SECTION	JUMPER (INSTALL)	ELECTRONICS SELECTION	JUMPER
WORLD CLASS PROBE	JM7	NEW GENERATION ELECTRONICS	REMOVE JM3, JM6



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Figure 2-13. Wiring Layout for IFT 3000 (CENELEC approved) with HPS (Sheet 1 of 2)



NOTE: FUSES SHOWN (F1 THROUGH F4) ARE 5 AMP, ANTI-SURGE,
TYPE T TO IEC127 (ROSEMOUNT PART NUMBER 1L01293H02).

219006-1

Figure 2-14. CENELEC Approved Heater Power Supply Wiring Connections

		JUMPER CONFIGURATIONS		ALWAYS DISCONNECT LINE VOLTAGE FROM HEATER POWER SUPPLY AND ANALOG ELECTRONICS (IF USED) BEFORE CHANGING JUMPERS.	
LINE VOLTAGE SELECTION	JUMPER (INSTALL)	HEATER POWER	JUMPER		
120 V.A.C.	JM4, JM1	*ON	INSTALL JM2		
220/240 V.A.C.	JM5	REMOTE	REMOVE JM2		
PROBE HEATER VOLTAGE SELECTION	JUMPER (INSTALL)	ELECTRONICS SELECTION	JUMPER		
*WORLD CLASS PROBE (44V)	JM7	NEW GENERATION ELECTRONICS	REMOVE JM3, JM6		

219007

Figure 2-15. Jumper Selection Label

CAUTION

If you reconfigure the equipment for a line voltage other than the one marked on the serial label and the mains filter of the power supply then you should change the marking on the serial label and the mains filter to state the new line voltage.

WARNING

Before supplying power to the heater power supply, verify that jumpers JM3 and JM6 are removed, and JM7 is installed. If relay wire (Figure 2-13, Note 1) is installed, JM2 must be removed from HPS Motherboard (Figure 2-16).

- Before supplying power to the heater power supply, verify that the jumpers on the motherboard, Figure 2-16, are properly configured. Jumpers JM3, JM6, should be removed and JM7 should be installed. Additionally, make sure that the proper jumper for your line voltage is installed, Figure 2-15. If relay wire (Figure 2-13, note 1) is not installed, JM2 should be installed on the HPS Motherboard (Figure 2-16).

- Ensure that the HPS 3000 is properly earthed by way of both the internal and external earthing points.
- Ensure the installation does not obscure the messages on either the HPS nameplate or HPS lid.

NOTE

Refer to Figures 2-8 and 2-10 for proper IFT jumper configuration. IFT microprocessor and interconnect board jumper configurations must be set correctly in order for HPS to work properly.

2-4. MULTIPROBE TEST GAS SEQUENCER INSTALLATION.

WARNING

The MPS 3000 Multiprobe Test Gas Sequencer must be installed in a non-hazardous, explosive-free environment.

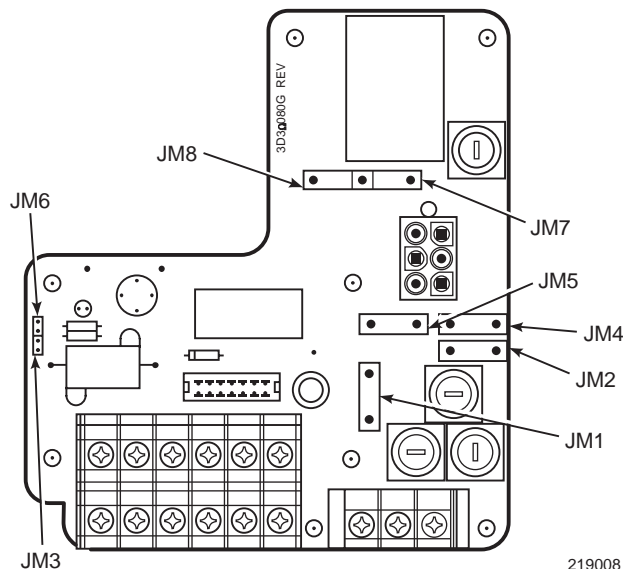


Figure 2-16. Jumpers on HPS Motherboard

NOTE

A Z-Purge option is available for the MPS 3000. Appendix DX contains information concerning the Z-Purge.

- Mechanical Installation.** The outline drawing of the MPS module in Figure 2-17 shows mounting centers and clearances. The box is designed to be mounted on a wall or bulkhead. The MPS module should be installed no further than 91 m (300 ft) piping distance from the probe, and no more than 303 m (1000 ft) cabling distance from the IFT. Install the MPS module in a location where the ambient temperature is between -30° and 71 °C (-20° and 160 °F).
- Gas Connections.** Figure 2-18 shows the bottom of the MPS where the gas connections are made. 1/4 in. threaded fittings are used.

- Connect the reference air supply to INSTR. AIR IN. The air pressure regulator valve is set at the factory to 138 kPa (20 psi). If the reference air pressure should need readjustment, turn the knob on the top of the valve until the desired pressure is obtained.
- Connect the high O₂ test gas to HIGH GAS. The test gas pressure should be set at 138 kPa (20 psi).

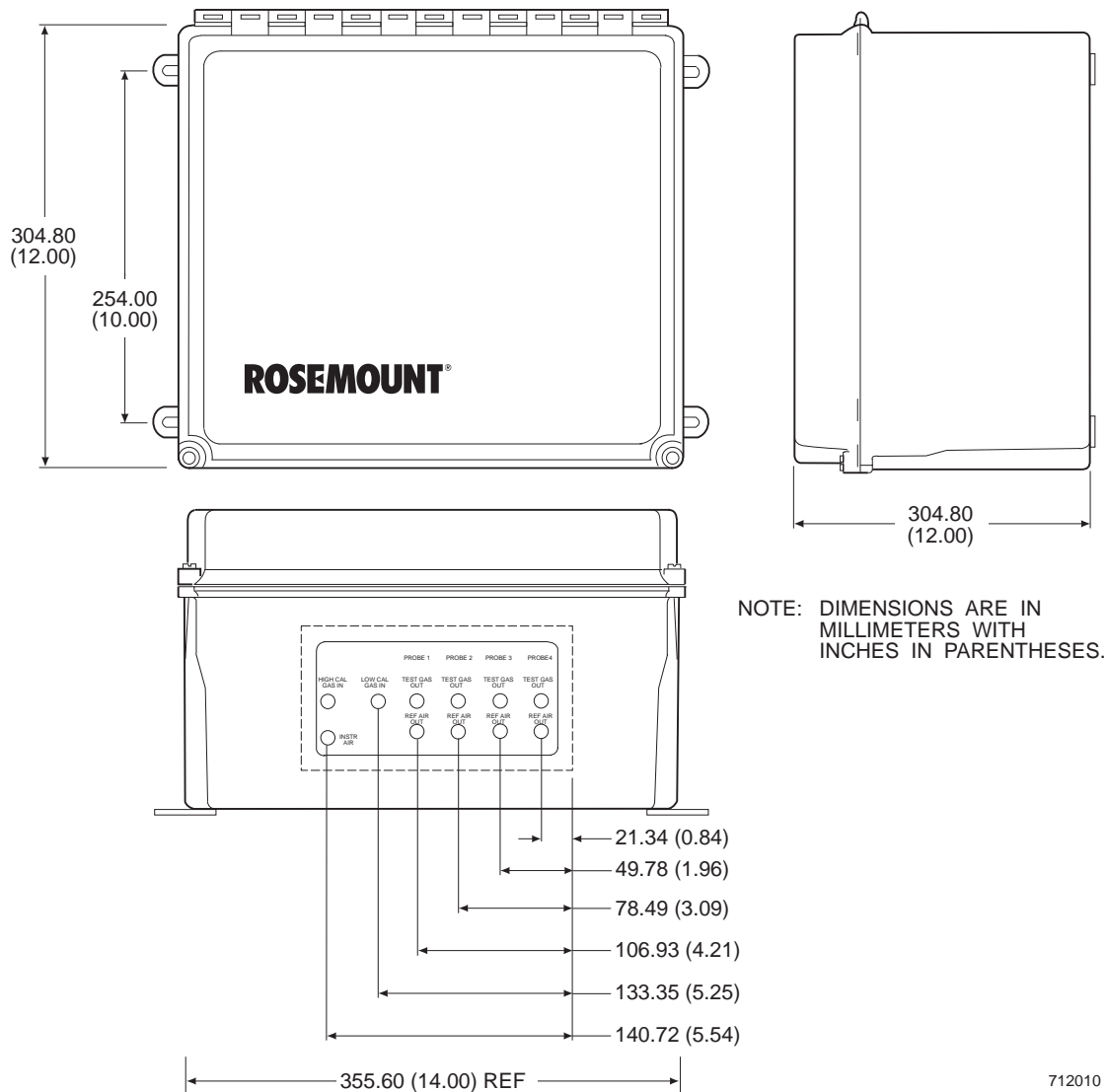


Figure 2-17. MPS Module

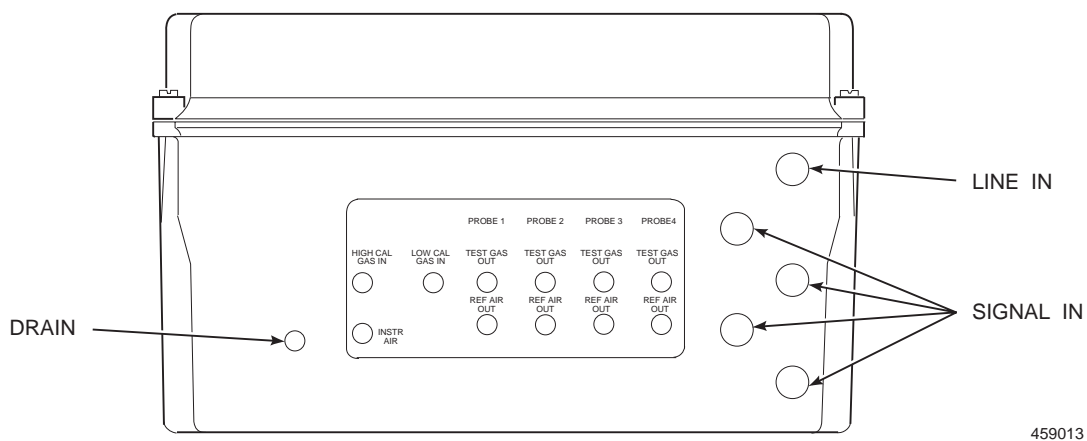


Figure 2-18. MPS Gas Connections

CAUTION

Do not use 100% nitrogen as a low (zero) gas. It is suggested that the low gas be between 0.4% and 2.0% O₂. Do not use gases with hydrocarbon concentrations of more than 40 parts per million. Failure to use proper gases will result in erroneous readings.

3. Connect the low O₂ test gas to LOW GAS. The test gas pressure should be set at 138 kPa (20 psi).
4. Connect the REF AIR OUT to the reference gas fitting on the probe junction box.
5. Connect the TEST GAS OUT to the calibration gas fitting on the probe junction box.
6. If the MPS is configured for multiple probes (up to four), repeat steps 4 and 5 for each additional probe.

CAUTION

A check valve is required for each probe connected to an MPS to prevent condensation of flue gas in the calibration gas lines. The check valve must be located between the calibration fitting and the gas line.

- c. **Electrical Connections.** Electrical connections should be made as described in the electrical installation diagram, Figure 2-19. All wiring must conform to local and national codes. The electrical connections will exist only between the electronics package and the MPS to enable automatic and semiautomatic calibration. If more than one probe system is being used, the additional probes and electric packages would be wired similarly to the first probe.

NOTE

MPS power supply fuse locations and specifications are shown in Figure 2-19.

1. Run the line voltage through the bulkhead fitting on the bottom of the MPS where marked LINE IN, Figure 2-18. Refer to Figure 2-19. Connect the line voltage to the LINE IN terminal on the MPS terminal board located inside the unit. Tighten the cord grips to provide strain relief.
2. The MPS can accommodate up to four probes. The terminal strips on the MPS termination board are marked PROBE 1, PROBE 2, PROBE 3, and PROBE 4. Select PROBE 1 if this is the first probe and electronic package installed on the MPS.
3. Make the connections from the MPS to the IFT as shown in Figure 2-19. Run wires from the MPS Termination Board inside the unit through the bulkhead fitting on the bottom of the unit where marked SIGNAL IN, Figure 2-18. After the connections are made, tighten the cord grips to provide strain relief.

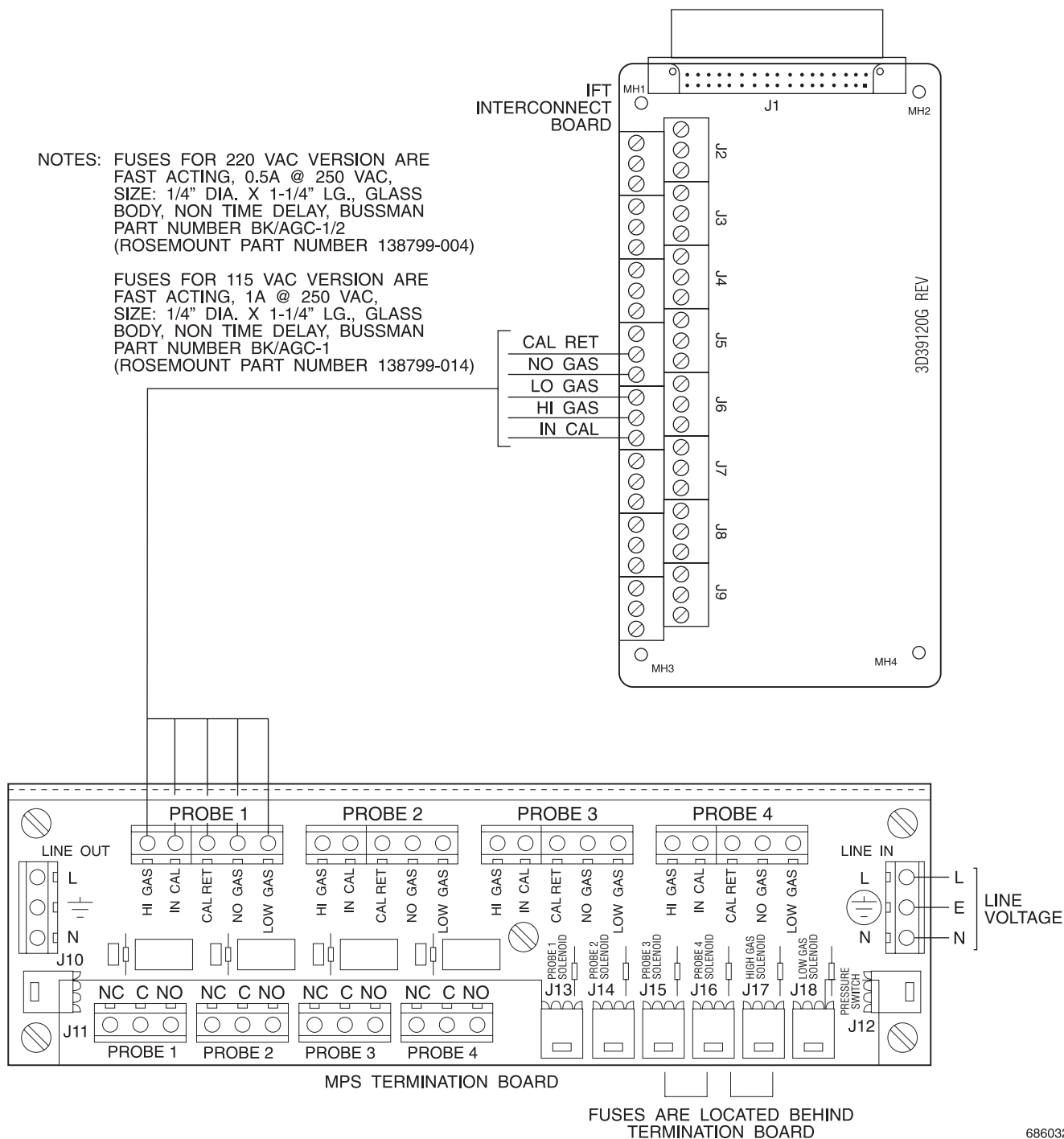


Figure 2-19. MPS Electrical Connections

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NOTE

Upon completing installation, make sure that the probe is turned on and operating prior to firing up the combustion process. Damage can result from having a cold probe exposed to the process gases.

During outages, and if possible, leave all probes running to prevent condensation and premature aging from thermal cycling.

CAUTION

If the ducts will be washed down during outage, **MAKE SURE** to power down the probes and remove them from the wash area.

SECTION III. GUI OPERATION

WARNING

See Safety Data Sheet 1M03296 for safety related information.

- 3-1. **OVERVIEW.** Ensure that the oxygen analyzer, heater power supply, and intelligent field transmitter have been properly connected. It is important to check that grounding and screening of terminations are correctly made to prevent the introduction of ground loops. The IFT is equipped with noise suppression circuitry on the power supply and signal input lines. Proper grounding at installation will ensure accuracy of function.

The following five languages can be selected within the IFT:

English	Italian
French	Spanish
German	

The Intelligent Field Transmitter may be supplied with any one of three configurations. These configurations are the blind version, display only version, and the deluxe version. The three versions differ as follows.

a. **Blind Version.**

WARNING

HART connections must be made outside of the hazardous area. Because the Hart option is not protected by energy limiting barriers, it must not be interfaced from within a hazardous area. The signal cables should be routed outside the hazardous area and the connections made external to the hazardous area.

The blind version has no display and no keypad. With this version, an external HART communications device is required. Refer to Appendix JX regarding the HART Communications option.

- b. **Display Only Version (LDP).** The display only version is also known as the LED Display Panel (LDP) version. This IFT contains a bright LED display and a four-key pad. The LDP version provides for calibration capability only.
- c. **Deluxe Version (GUI).** The deluxe version is also known as the General User Interface (GUI) version. This IFT contains an LED display, liquid crystal display panel, and an eight-key pad that allows probe and electronics configuration, calibration, and troubleshooting of the probe and electronics.

This section of the manual deals with operator controls and displays available with the GUI equipped IFT. Operating parameters are listed and instructions are included for viewing and changing them.

Operating instructions for the IFT equipped with the LDP and four membrane keys are included in Section IV.

Any procedures not associated with normal operation are included in Section II, Installation, or Section V, Troubleshooting.

3-2. **IFT WITH GUI AND LDP FRONT PANEL CONTROLS AND INDICATORS.** (See Figure 3-1.)

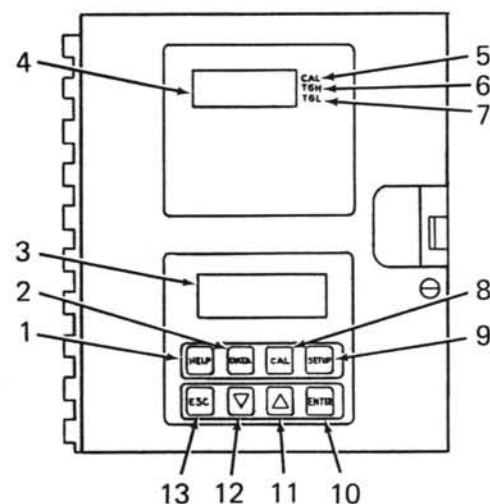


Figure 3-1. IFT with GUI and LDP Front Panel

Fig. 3-1

<u>Index No.</u>	<u>Control/LED</u>	<u>Description</u>
1	HELP	Context sensitive HELP is displayed when this key is pressed.
2	DATA	DATA key is used to access DATA menu.
3	LCD Display	Top line displays system status, menu and probe number.
4	LED Display	Indicates current O ₂ or test value (only in LDP equipped units).
5	CAL	Calibration in progress indicator light (only in LDP equipped units).
6	TGH	High test gas indicator light. High test gas is being used in calibration process (only in LDP equipped units).
7	TGL	Low test gas indicator light. Low test gas is being used in calibration process (only in LDP equipped units).
8	CAL	CAL key used to access CALIBRATE menu.
9	SETUP	SETUP key used to access SETUP menu.
10	ENTER	The ENTER key is used to select a lower level menu, initiate calibration, or select a parameter to change.
11	▲	The increase key is used to move the cursor (asterisk) when scrolling through lists or to increase a parameter value.
12	▼	The decrease key is used to move the cursor (asterisk) when scrolling through lists or to decrease a parameter value.
13	ESC	The escape key is used to exit to a high level menu or to abort a parameter change.

3-3. HELP KEY. The HELP key will display explanatory information about a menu, sub-menu, or parameter that the asterisk is next to when pressed. The HELP key is not available during calibration routines. Refer to Table 3-1 for sample HELP messages.

Table 3-1. Sample HELP Messages.

<u>MENU, SUB-MENU, HELP OR PARAMETER NAME</u>	<u>MESSAGE</u>
PROBE DATA	Press ENTER key to access DATA menu.
CALIBRATE O ₂	The CAL menu is used to start calibration and view calibration.
SETUP	The SETUP menu is used to configure the IFT-3000.

3-4. STATUS LINE. The top line of the LCD display (3, Figure 3-1) is a status line that always displays system status, menu name, and O₂ level. The system status displays are:

- a. **OK** - System is functioning correctly.
- b. **CAL** - Calibration in progress.
- c. **C Err** - Calibration error.
- d. **H Err** - Heater error.
- e. **TGLow** - Test gas is low.
- f. **HiO₂** - O₂ value is above the high alarm limit.
- g. **LoO₂** - O₂ value is below the low alarm limit.
- h. **R Hi** - Resistance is above the high limit.
- i. **Off** - The probe has been turned off because the IFT cannot control the heater temperature.
- j. **PRBE** - The probe is disconnected, cold, or leads are reversed.

3-5. QUICK REFERENCE CHART. The quick reference chart on pages 3-4 and 3-5 is designed to help you determine how to get where you want to be in the menu system. The chart shows all the available menu and submenu options for the IFT. Follow the lines to determine which choices to make. Moving down a level on the chart is accomplished by use of the ENTER key. To move up a level on the chart, press the ESCAPE key.

3-6. MAIN MENU. When power is first applied to the IFT, the MAIN menu (Table 3-2) is initially displayed. It is from the MAIN menu that the PROBE DATA (Table 3-3), CALIBRATE O₂ (Table 3-4), and SETUP (Table 3-5) menus can be accessed.

Table 3-2. Main Menu

MENU SELECTION	DESCRIPTION
PROBE DATA	Refer to Table 3-3.
CALIBRATE O ₂	Refer to Table 3-4.
SETUP	Refer to Table 3-5.

3-7. PROBE DATA SUB-MENU. The PROBE DATA sub-menu is a list of all the parameters of the system as it is currently configured. To access the PROBE DATA sub-menu, press the DATA key at any time. The increase and decrease keys are used to scroll through the list. The PROBE DATA sub-menu can be viewed but not changed. The operator must use the SETUP menu to change any of the parameters.

There are two selections available on the PROBE DATA sub-menu; Process Data and Diagnostic Data. Refer to Table 3-3 for contents of the sub-menu.

Table 3-3. PROBE DATA Sub-Menu.

SUB-MENU SELECTION	PARAMETER	DESCRIPTION
<u>Process Data</u>	O ₂ __% Efficiency ENA/DIS Stack Temp __DegC	O ₂ value for the probe. Enable/Disable efficiency display. Stack temperature.
<u>Diagnostic Data</u>		
Temperature	Cell __DegC Stack __DegC Cold Junt __DegC	Cell temperature of the probe. Stack temperature. Cold junction temperature.
Voltages	Cell __mV Cell T/C __mV Stk T/C __mV Cold Jnt __mV	Cell voltage of the probe. Cell thermocouple voltage of the probe. Stack thermocouple voltage. Cold junction voltage.
Output Values	Analog __% FS K1 State OFF/ON K2 State OFF/ON	Analog output voltage. Status of relay 1. Status of relay 2.

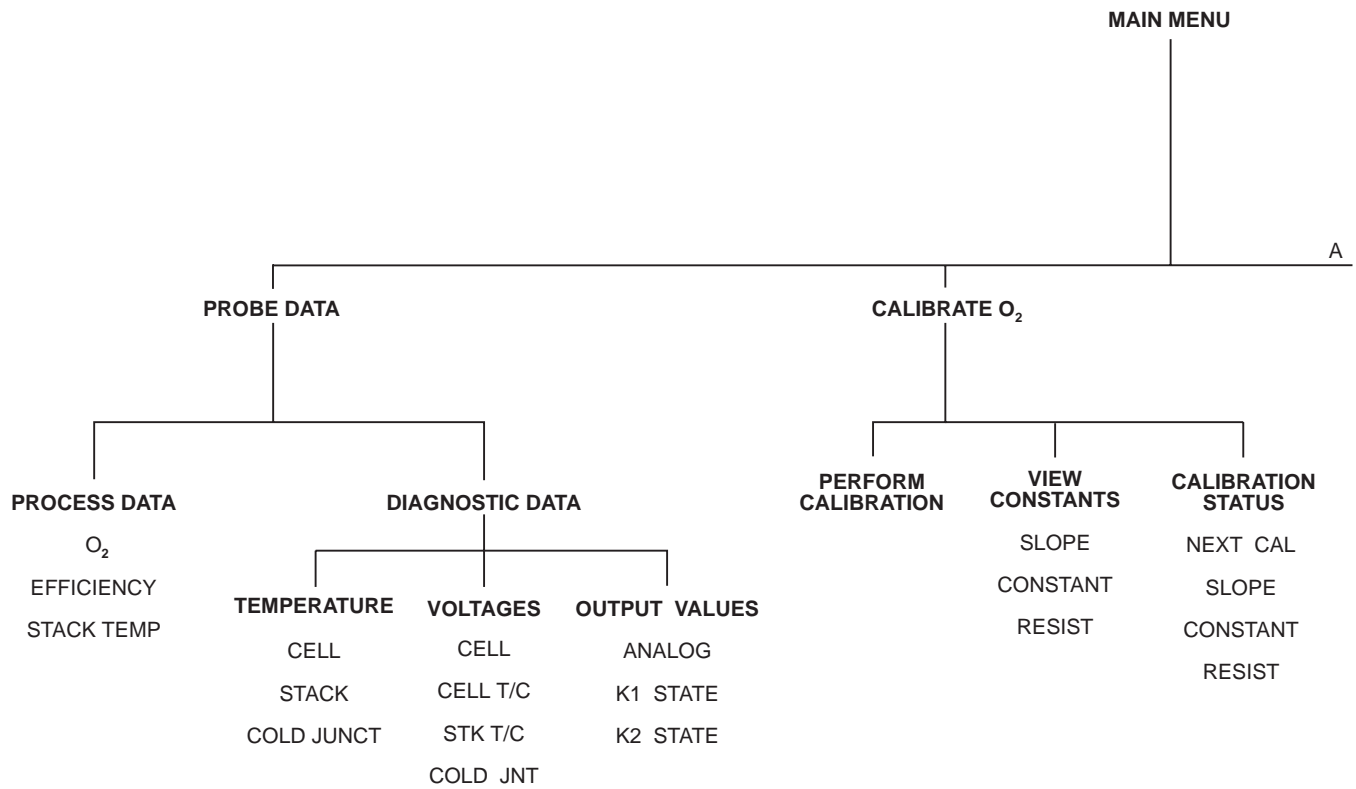
3-8. CALIBRATE O₂ SUB-MENU. The CALIBRATE O₂ sub-menu (Table 3-4) is used to enter the calibration mode. To access the CALIBRATE O₂ sub-menu, press the CAL key at any time. The increase and decrease keys are used to scroll through the list.

The CALIBRATE O₂ sub-menu has three selections available: Perform Calibration, View Constants, and Calibration Status. Refer to Table 3-4 for contents of the sub-menus.

Perform Calibration has two options depending on how Auto Cal is selected in Probe Setup. Refer to SETUP Setting in Table 3-4.

3-9. SETUP SUB-MENU. The SETUP sub-menu is used to enter all operator set variables into the system. To access the SETUP sub-menu, press the SETUP key at any time. To select the parameter to be changed, move the cursor to the desired parameter using the arrow keys. Press ENTER to select that parameter. To change the value for that parameter, use the arrow keys to increase or decrease the value. Press ENTER to save changes.

QUICK REFERENCE CHART



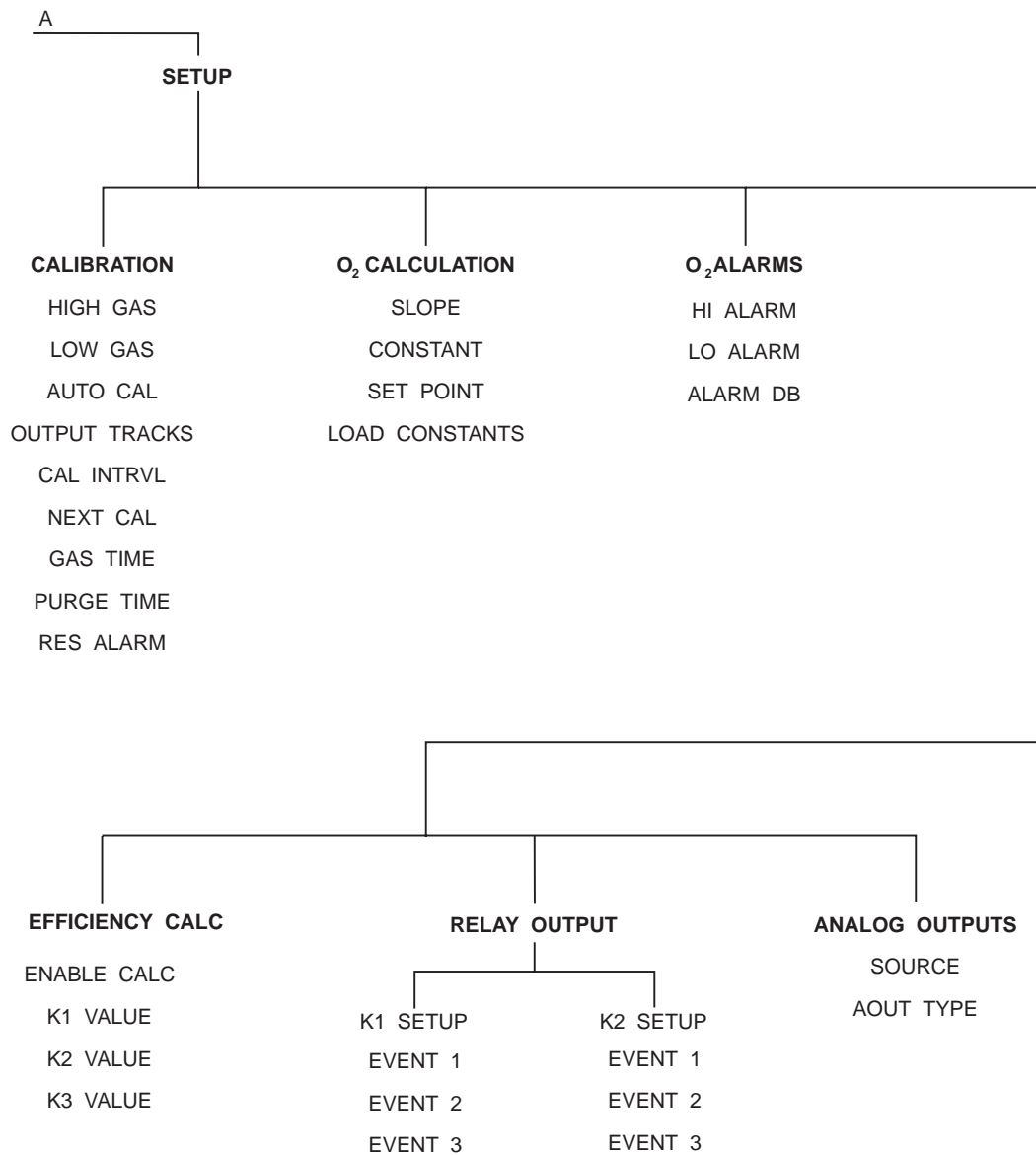


Table 3-4. CALIBRATE O₂ Sub-Menu.

SUB-MENU SELECTION	SETUP SETTING (SEE TABLE 3-4)	DISPLAY	DESCRIPTION
<u>Perform Calibration</u>	Auto Cal in Probe Setup is YES.	Press ENTER to start Auto Calibration. Starting Automatic Calibration High Gas ____%O ₂ Time Left 0:00 Cell mV ____mV Low Gas ____%O ₂ Time Left 0:00 Cell mV ____mV Resistance Check Time Left 0:00 Cell ____mV ____C Calibration Complete Purging 0:00 Cell ____mV ____C Calibration Complete	MPS will start calibrating probe. Value for high O ₂ test gas. Amount of time necessary to complete the current testing phase in min:sec. Cell voltage of the probe. Value for low O ₂ test gas. Amount of time necessary to complete the current testing phase in min:sec. Cell voltage of the probe. Resistance check in progress. Cell voltage and probe temperature. Gas lines are being purged of test gas. Cell voltage and probe temperature.
	Auto Cal in Probe Setup is NO.	Press ENTER to start Manual Calibration. Switch ON high test gas. Press ENTER when ready. High gas ____%O ₂ Press ENTER when O ₂ reading is stable. Turn OFF high test gas and ON low test gas. Press ENTER when ready. Low gas ____%O ₂ Press ENTER when O ₂ reading is stable. Resistance Check Turn off low test gas. Press ENTER when ready. Press ENTER when probe has returned to process.	Manual calibration sequence will begin when ENTER is pressed. High O ₂ test gas value. Low O ₂ test gas value. Resistance check in progress.
<u>View Constants</u>	(N/A)	Slope ____mV/D Constant ____mV Resist ____ohms	Slope for probe. Offset for probe. Resistance for probe.
<u>Calibration Status</u>	(N/A)	Next Cal XD XH Slope ____ Constant ____ Resist ____	Time until next calibration in number of days and number of hours. Status of the slope. Status of the offset. Status of the resistance.

Table 3-5. SETUP Sub-Menu.

SUB-MENU SELECTION	PARAMETERS	DESCRIPTION
<u>Calibration</u>	High Gas ____%O ₂ Low Gas ____%O ₂ Auto Cal YES/NO Output Tracks YES/NO Cal Intrvl XD XH Next Cal XH Gas Time 0:00 Purge Time 0:00 Res Alarm ____	Value of high O ₂ test gas. Value of low O ₂ test gas. If system has MPS, select YES or NO. Select output tracks. Select time between calibrations in number of days and number of hours. (1 year max.) Time until next calibration in number of hours. (1 year max.) Amount of time the test gases will be turned on in number of minutes and seconds, allow enough time for signal values to stabilize. Amount of time for gas lines to clear of test gas. Resistance alarm set from 50 to 10,000 ohms.
<u>O₂ Calculation</u>	Slope ____ mV/D Constant ____ mV Set Point ____ °C	Set value between 34.5 and 57.5. Set value between -20.0 and +20.0 mV. Set either 736 for World Class 3000 probes or 843 for 218 probes.
<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>CAUTION</p> <p>Ensure the correct voltage is selected when using HPS 3000 with either WC 3000 probes or 218 probes. Refer to Figure 2-14, Jumper Selection Label for proper voltage selections. If incorrect SET POINT is selected, damage to the probe may occur.</p> </div>		
	Load Constants	Press ENTER to load constants from last calibration.
<u>O₂ Alarms</u>	Hi Alarm ____%O ₂ Lo Alarm ____%O ₂ Alarm DB ____%O ₂	Set value for high alarm limit. Set value for low alarm limit. Set value for alarm dead band.
<u>Efficiency Calc.</u>	Enable Calc. YES/NO K1 Value ____ K2 Value ____ K3 Value ____	Select YES to enable, NO to disable. Set between 0.0000 and 1.0. Refer to Table 3-6. Set between 0.0000 and 1.0. Refer to Table 3-6. Set between 1.000 and 20.0. Refer to Table 3-6.
<u>Relay Outputs</u> K1 Setup K2 Setup	Event 1 ____ Event 2 ____ Event 3 ____ Event 1 ____ Event 2 ____ Event 3 ____	Set event to activate relay. Set event to activate relay. Set event to activate relay. Set event to activate relay. Set event to activate relay. Set event to activate relay.
<u>Analog Outputs</u>	Source (EFF or O ₂) 0-100% Aout Type 0-10V	Source can be set to 0-1%, 0-5%, 0-10%, 0-25%, 0-100% of O ₂ , or 0-100% Efficiency Aout Type can be set to 0-10 V, 0-20 mA, or 4-20 mA

There are six selections available on the SETUP sub-menu: Calibration, O₂ Calculation, O₂ Alarms, Efficiency Calc., Relay Outputs, and Analog Outputs. Refer to Table 3-5 for the contents of the SETUP sub-menu.

NOTE

Dip shunt is to be set for voltage or current operation. Refer to Figure 2-7.

Table 3-6. Efficiency Constants.

CONSTANT	UNITED STATES		EUROPE	
	GAS	OIL	GAS	OIL
K1	0.407	0.432	0.66	0.69
K2	0.0	0.0	0.0082	0.0051
K3	5.12	5.12	12.28	8.74

3-10. SYSTEM CALIBRATION.

- a. **Overview.** The primary purpose of an oxygen analyzer is to give an accurate representation of the percentage of O₂ in the gas stream. The system should be calibrated periodically to maintain an accuracy which may otherwise reduce over time due to cell aging.

A requirement for calibration is a set of two accurate test gases spanning the oxygen range of most interest. For example, 0.4% and 8% for a 0-10% oxygen range.

Under normal conditions the probe should not need frequent calibration. Because calibration is necessary, the system can be equipped with the optional MPS 3000 Multiprobe Test Gas Sequencer for fully automatic calibration at regular intervals. Without an MPS, the probes must be calibrated manually (semiautomatically).

b. Probe Calibration.

1. Previous Calibration Constants Functionality.
Three sets of registers are used to store calibration constants. These are: Latest Calibration, Previous Calibration, and Calculation. Only the values in the Calculation registers are used to calculate the oxygen value for display and representation on the analog output signal. These values may be changed in two ways:
 - (a) The operator may change the Calculation values by entering the SETUP menu and then entering the O₂ Calculations sub-menu. The operator may adjust the slope and constant individually or reset both to the values calculated during the last good calibration. Simultaneously resetting both values is done by selecting Load Constants and pressing ENTER.
 - (b) The IFT will automatically change the values after each successful calibration.

The values in the Latest Calibration registers are updated after every complete calibration even if the calibration is not successful. If the calibration is successful, the values in

the Latest Calibration registers are copied into the Previous Calibration registers. This function is accomplished prior to the update of the Latest Calibration registers. The values from successful calibrations are automatically loaded into the Calculation registers for use in future O₂ calculations. If a calibration fails, the Previous Calibration registers and Calculation registers retain their existing values, while the Latest Calibration registers record the values of the failed calibration.

2. Calibration Methods. There are three calibration methods: manual (semi-automatic), manually initiated automatic, and fully automatic. Manual (semiautomatic) calibration is done without an MPS unit. Test gases are switched on and off by the operator and the IFT is sequenced through the calibration procedure by the operator with the front panel keyboard. The IFT prompts the operator for the correct action. Manually initiated automatic calibration is done with an MPS. The operator manually initiates the calibration at the IFT or through a remote switch, and the IFT controls the operation of the MPS unit and the calibration sequencing. Fully automatic calibration requires no action from the operator. The setup is the same as semiautomatic except the IFT automatically initiates the calibration at a fixed calibration interval. In this mode the operator can also manually initiate calibrations between the intervals in the same manner as semiautomatic calibrations.

c. Manual (Semiautomatic) Calibration.

1. Test Gases For Manual (Semiautomatic) Calibration. There are two options for supplying test gases to the probe during semiautomatic calibration. The first "A" uses refillable bottles and adjustable 2-stage pressure regulators; the second, "B" uses disposable bottles and a fixed single-stage regulator to provide a mixed flow. Normally, the first (method "A") will have a higher cost and not be portable. The second ("B") is less costly, portable, and weighs about 4.54 kg (10 lbs).

(a) Required Equipment.

CAUTION

Do not use 100% nitrogen as a zero gas. It is suggested that gas for the zero be between 0.4% and 2.0% O₂. Do not use gases with hydrocarbon concentrations of more than 40 parts per million. Failure to use proper gases will result in erroneous readings.

- 1 Two tanks of precision calibration gas mixtures. Recommended calibration gases are nominally 0.4 percent and 8.0 percent oxygen in nitrogen.

Two sources of calibrated gas mixtures are:

**LIQUID CARBONIC GAS
CORP. SPECIALTY GAS
LABORATORIES**

700 South Alameda Street
Los Angeles, California 90058
213/585-2154

767 Industrial Road
San Carlos, California 94070
415/592-7303

9950 Chemical Road
Pasadena, Texas 77507
713/474-4141

12054 S.W. Doty Avenue
Chicago, Illinois 60628
312/568-8840

603 Bergen Street
Harrison, New Jersey 07029
201/485-1995

255 Brimley Road
Scarborough, Ontario, Canada
416/266-3161

2600 Cajon Blvd.
San Bernardino, CA 92411
714/887-2571
TWX: 910-390-1159

1290 Combermere Street
Troy, MI 48084
314/589-2950

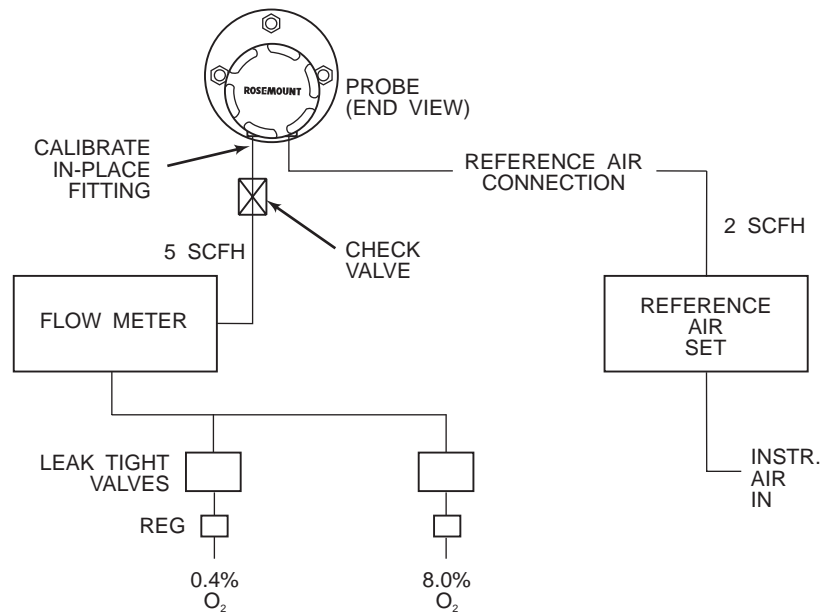
Route 611
Plumsteadville, PA 18949
215/766-8861
TWX: 510-665-9344

2616 South Loop West,
Suite 100
Houston, TX 77054
713/669-0469

- 2 A check valve is required at the probe (between the calibration fitting and the gas line) to prevent the migration of process gases down the calibration gas line.
- 3 Two, 2-stage pressure regulators with stainless steel diaphragms for tanks. Maximum output required: 138 kPa (20 psi).
- 4 One instrument air pressure regulator: 138 kPa (20 psi) maximum and a supply of clean, dry instrument air.
- 5 Two zero-leakage shutoff valves.
- 6 Miscellaneous oil-free tubing and fittings.

(b) Calibration.

- 1 A typical calibration setup is shown in Figure 3-2. Care must be taken that all fittings are tight and free from oil or other organic contaminants. Small openings can cause back diffusion of oxygen from the atmosphere even though positive pressures are maintained in the lines.



NOTE: PROBE CALIBRATION GAS FITTING HAS A SEAL CAP THAT MUST BE IN PLACE AT ALL TIMES EXCEPT DURING CALIBRATION.

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Figure 3-2. Typical Calibration Setup

NOTE

The probe calibration gas fitting has a seal cap which must be in place at all times except during calibration.

In addition to the precision calibration gas mixtures, clean, dry, oil-free instrument air should be used for calibration.

CAUTION

For optimum accuracy, this calibration should be run with the process at normal temperature and operating conditions.

When the calibration gas line exceeds 1.8 m (6 ft) in length from the leak tight valves, a

check valve, Rosemount P/N 6292A97H02, should be installed next to the calibration gas connection on the probe to prevent breathing of the line with the process gas and subsequent gas condensation and corrosion.

NOTE

Only set the test gas flowmeter upon initial installation and after changing the diffusion element. A slightly lower test gas flow rate may indicate a plugged diffusion element.

- 2 Set the test gas pressure regulators and the flow meter for a flow of 5 scfh at (20 psig) 138 kPa for both gases. The reference gas should be flowing as in normal operation.
- 3 Refer to paragraph 3-9d of this section for Manual (Semi-automatic) Calibration setup and procedure using the IFT.
- 4 Test gases will be switched on and off using the shutoff valves.

Test Method "B" Rosemount Oxygen Test
Gas and Service Kit.

(a) Required Equipment

CAUTION

Do not use 100% nitrogen as a zero gas. It is suggested that gas for the zero be between 0.4% and 2.0% O₂. Do not use gases with hydrocarbon concentrations of more than 40 parts per million. Failure to use proper gases will result in erroneous readings.

- 1 Portable Rosemount Oxygen Test Gas Kits (Figure 3-3), Rosemount Part Number 6296A27G01, containing 8% and 0.4% gases in a portable carrying case with regulator, built-in valve, hose and hose connecting adapter to the calibration gas connection.

- 2 Extra gas bottles are available at:

Rosemount Analytical Inc.
Box 901
Orrville, Ohio 44667
U.S.A.

Rosemount Limited
Burymead Road
Hitchin, Herts. U.K.

Rosemount Italy
VIA Guido Cavalcanti 8
20127 Milan, Italy

Rosemount Spain
Saturnino Calleja 6
28002 Madrid, Spain

Rosemount France
165 Boulevard de Vallmy
92706, Colombes, France

Rosemount Part Number
3530B07G01 for probe 0.4%
oxygen in nitrogen in disposable
bottle.

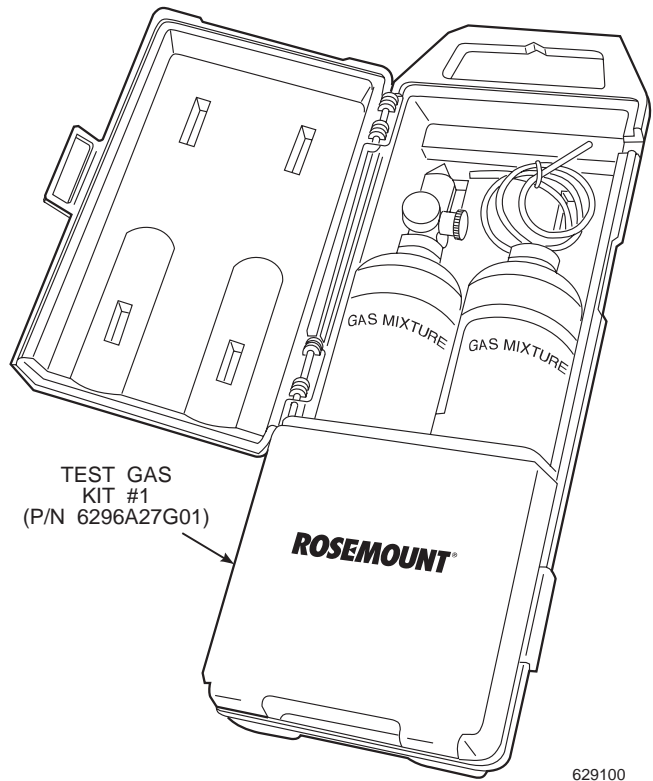


Figure 3-3. Portable Rosemount Oxygen Test Gas Kit

Rosemount Part Number
3530B07G02 for probe 8% oxygen
in nitrogen in disposable bottle.

- 3 A check valve is required at the probe (between the calibration fitting and the gas line) to prevent the migration of process gases down the calibration gas line.

(b) Calibration with a Portable Rosemount Oxygen Test Gases Kit.

- 1 A typical portable test calibration setup is shown in Figure 3-4. For Manual (semiautomatic) calibration, remove cap plug from the calibrate-in-place fitting. The cap plug must be retained to seal this fitting after calibration is complete; failure to do so may render the probe useless if the system pressure is slightly negative. The reference gas should be flowing as in normal operation.

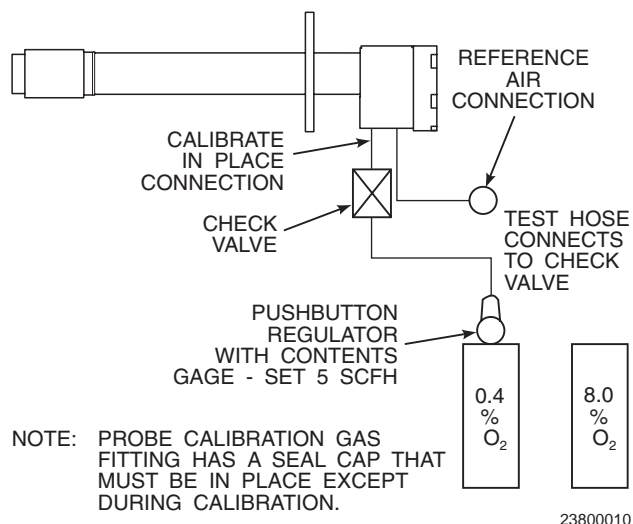


Figure 3-4. Typical Portable Test Calibration Setup

- 2 Refer to paragraph 3-9d of this section for Manual (Semi-automatic) Calibration setup and procedure using the IFT.
- 3 Screw the push button regulator with contents gage on to the test gas of choice and inject the test gas by opening the valve. Gas is on continuously when the valve is opened.

d. Manual (Semiautomatic) Calibration Procedure.

WARNING

Consult Safety Data Sheet 1M03296 before performing any work on the CENELEC approved IFT 3000.

The following procedure relates to an operator initiated calibration selected at the IFT by pressing the CAL key. The calibration is manually performed by the operator upon data queues from the IFT. Any system without an MPS 3000 Multiprobe Test Gas Sequencer must follow these steps.

1. Press SETUP to display the SETUP menu. Select PROBE CALIBRATION sub-menu. Ensure that Auto Cal is disabled. Set the cursor on Auto Cal. Press ENTER. Set Auto Cal to NO if not already done.
2. Press the CAL key. Select PERFORM CALIBRATION sub-menu. "Press ENTER to start Manual Calibration" will appear on the LCD display. Press ENTER to start. Follow the data queues. Refer to Table 3-4. CALIBRATE O₂ Menu.

e. Fully Automatic Calibration.

WARNING

Consult Safety Data Sheet 1M03296 before performing any work on the CENELEC approved IFT 3000.

1. Test Gases For Fully Automatic Calibration. For fully automatic calibration, an MPS 3000 Multiprobe Test Gas Sequencer is required as well as the two types of test gas.

CAUTION

Do not use 100% nitrogen as a zero gas. It is suggested that gas for the zero be between 0.4% and 2.0% O₂. Do not use gases with hydrocarbon concentrations of more than 40 parts per million. Failure to use proper gases will result in erroneous readings.

Two tanks of precision calibration gas mixtures. Recommended calibration gases are nominally 0.4 percent and 8.0 percent oxygen in nitrogen.

A typical automatic calibration system is shown in Figure 3-5.

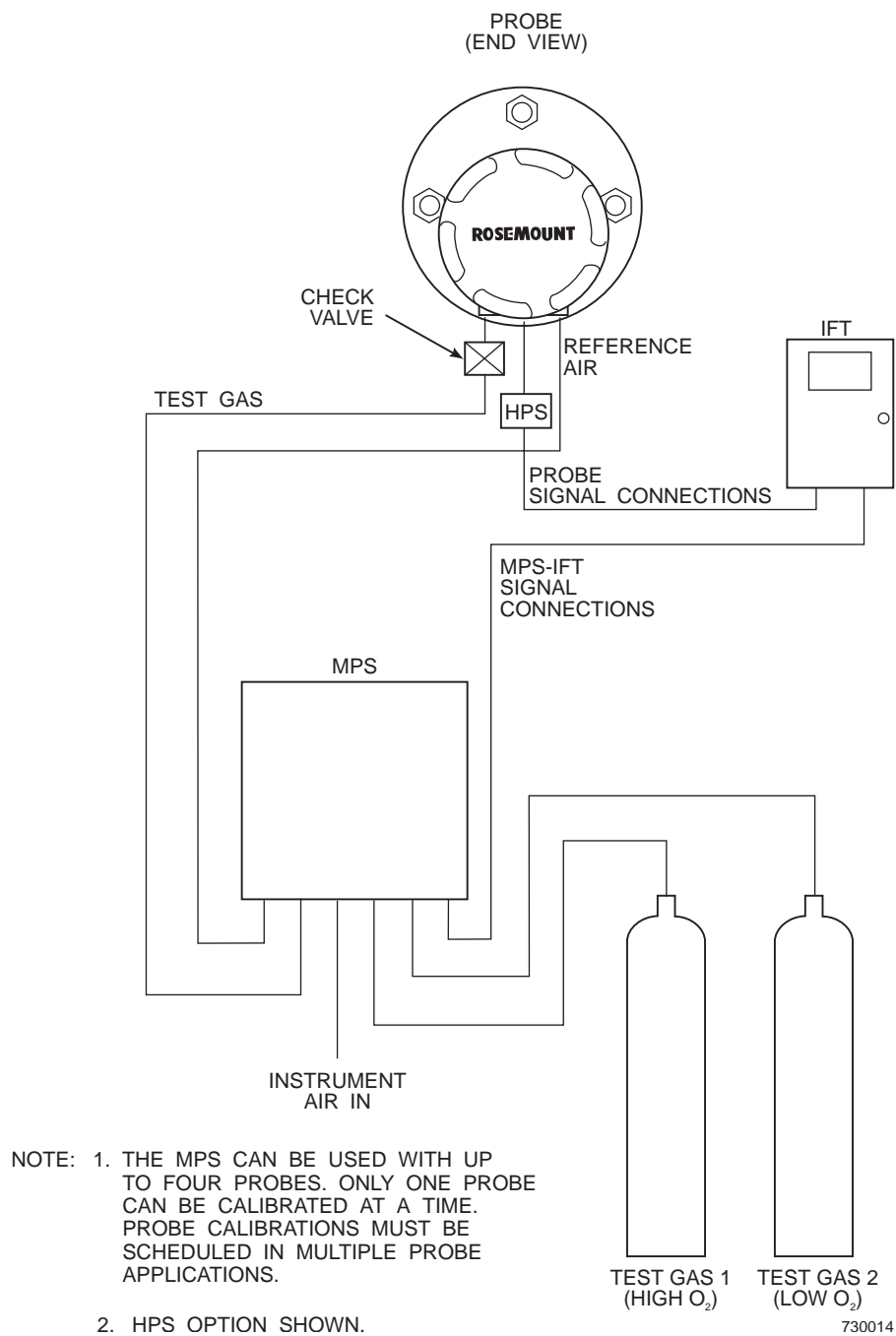


Figure 3-5. Typical Automatic Calibration System

2. Fully Automatic Calibration Setup. In order for the IFT system to calibrate automatically, the following parameters from the CALIBRATE sub-menu in the IFT have to be entered. Refer to Table 3-5. SETUP Sub-Menu.

(a) Auto Cal YES/NO

Set to YES

(b) Output Tracks YES/NO

Set as desired to configure analog output tracking.

(c) Cal Intrvl XD XH

Set the desired time between calibrations in number of days and hours. (1 year max.)

(d) Next Cal. XD XH

Displays the time left to the start of the next calibration. Set the desired time until the start of the next calibration. If nothing is entered here, the unit will automatically enter the cal intrvl and count down from that. (1 year max.)

(e) Gas Time 0:00

Set the amount of time for the test gasses to be turned on in number of minutes and seconds, allow enough time for signal values to stabilize.

(f) Purge Time 0:00

Set the amount of time for the gas lines to clear in number of minutes and seconds.

(g) Abort Time 0:00

Set the amount of time allowed between key functions before the calibration procedure is aborted in number of minutes and seconds.

(h) Res Alarm _____

Set the desired resistance alarm between 50 - 10000 ohms.

Once these parameters have been set, the system will initiate calibration without operator intervention as set by the CAL INTVL parameter.

3. Manually Initiated Fully Automatic Calibration Procedure. The following procedure relates to an operator initiated calibration, either by a remote switch (CAL INIT on interconnect board) or selected at the IFT by pressing the CAL key using an MPS 3000 Multiprobe Gas Sequencer.

(a) Press SETUP to display the SETUP sub-menu. Select Calibration. Ensure that Auto Cal is enabled. Set the cursor on Auto Cal. Press ENTER. Set Auto Cal to YES if not already done.

(b) Press the CAL key. Select Perform Calibration. "Press ENTER to start Automatic Calibration" will appear on the LCD display. Press ENTER to start. Refer to Table 3-4. CALIBRATE O₂ Sub-Menu.

SECTION IV. LDP OPERATION

WARNING

Consult Safety Data Sheet 1M03296 before performing any work on the CENELEC approved IFT 3000.

- 4-1. OVERVIEW.** Ensure that the oxygen analyzer, heater power supply (if included with the system), and intelligent field transmitter have been properly connected. It is important to check that grounding and screening of terminations are correctly made to prevent the introduction of ground loops. The IFT is equipped with noise suppression circuitry on the power supply and signal input lines. Proper grounding at installation will ensure accuracy of function.

This section of the manual deals with operator controls and displays available for the IFT equipped with LDP and four membrane keys.

Operating instructions for the GUI equipped IFT are included in Section III.

Any procedures not associated with normal operations are included in Section II, Installation, or Section V, Troubleshooting.

- 4-2. IFT WITH LDP FRONT PANEL CONTROLS AND INDICATORS.** (See Figure 4-1.)

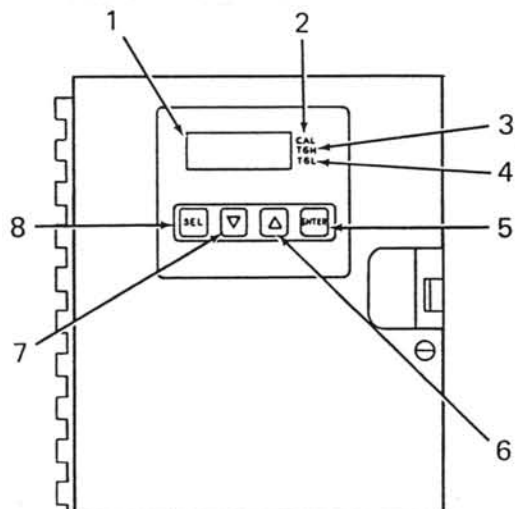


Figure 4-1. IFT with LDP Front Panel

Fig. 4-1

Index No.	Control/LED	Description
1	LED Display	Indicates current O ₂ or test gas value.
2	CAL	Calibration in progress indicator light.
3	TGH	High test gas indicator light. High test gas is being used in calibration process.
4	TGL	Low test gas indicator light. Low test gas is being used in calibration process.
5	ENTER	The ENTER key is used to initiate calibration or select a test gas parameter to change.
6	▲	The increase key is used to increase the value of the test gas parameters.
7	▼	The decrease key is used to decrease the value of the test gas parameters.
8	SEL	The select key is used to scroll through the list of parameters.

- 4-3. LDP DISPLAYS.**

WARNING

Consult Safety Data Sheet 1M03296 before performing any work on the CENELEC approved IFT 3000.

The LDP equipped IFT contains four selectable displays. The displays are selected by pressing the SEL key. The display is advanced once each time the SEL key is depressed and continually scrolls. The only parameters which the operator is permitted to change

change are H (high test gas) and L (low test gas). When a parameter is to be changed, press the ENTER key. To change the parameter, the increase and decrease arrows are depressed until the proper value is displayed. Depress the ENTER key to accept the new value, or the SEL key to abort the change. The four displays are as follows:

- a. **O₂**. The O₂ selection will display the O₂ value on the LED display when ENTER key is depressed.
- b. **H**. The high test gas display allows the value of the high test gas parameter to be changed for calibration purposes.
- c. **L**. The low test gas display allows the value of the low test gas parameter to be changed for calibration purposes.
- d. **CAL**. The calibration selection allows the operator to initiate the calibration process when ENTER key is depressed.

4-4. LDP DEFAULTS. The LDP equipped IFT is programmed at the factory with the defaults indicated in Table 4-1. For a description of the defaults refer to Table 3-4. SETUP Sub-Menu.

4-5. CALIBRATION.

- a. **Overview.** The LDP equipped IFT is configured at the factory for manual (semiautomatic) calibration. Calibration must be manually initiated. Information on test gases and hardware requirements may be found in paragraph 3-9, Calibration.

- b. **Manual Calibration.** The following procedures relate to an operator initiated calibration. The calibration is manually performed by the operator upon data queues from the IFT. Any system without an MPS 3000 multiprobe test gas sequencer must follow these steps.

WARNING

Consult Safety Data Sheet 1M03296 before performing any work on the CENELEC approved IFT 3000.

1. Press the SEL key until CAL is shown on the LED display.
2. Press ENTER. The CAL light is now on. Turn on high test gas.
3. Press ENTER. The TGH light is now flashing.
4. When the value shown on the LED display has stabilized, press ENTER. Turn off high test gas.
5. Turn on low test gas. Press ENTER. The TGL light is now flashing.
6. When the value shown on the LED display has stabilized, press ENTER.
7. Turn off low test gas. Press ENTER.
8. All indicator lights are off. Calibration complete.

Table 4-1. LDP Defaults.

PARAMETER	DEFAULT	PARAMETER	DEFAULT
Probe Calibration		Efficiency Calc.	
High Gas	8.0%	Enable Calc.	NO
Low Gas	0.4%	K1 Value	0.0
Auto Cal	NO	K2 Value	0.0
Output Tracks	YES	K3 Value	0.0
Cal Interval	OFF		
Next Cal	Disabled	Relay Outputs (K1)	
Gas Time	5:00 MIN	Event 1	Heater Fail
Purge Time	5:00 MIN	Event 2	Cal. Fail
Resistance Alarm	1000 ohms	Event 3	INCAL
O ₂ Calculation		Relay Outputs (2)	
Slope	____(value from calibration)	Event 1	LO O ₂
Constant	____(value from calibration)	Event 2	OFF
Htr Set Point	736 °C (when implemented)	Event 3	OFF
O ₂ Alarms		Analog Output	
HI Alarm	30%	Source	O ₂ 0-10%
LO Alarm	0.3%	Aout Type	4-20mA
Alarm DB	0.0%		

SECTION V. SYSTEM TROUBLESHOOTING

WARNING

Consult Safety Data Sheet 1M03296 before performing any work on the CENELEC approved IFT 3000.

WARNING

Install all protective equipment covers and safety ground leads after troubleshooting. Failure to install covers and ground leads could result in serious injury or death.

5-1. OVERVIEW. The system troubleshooting describes how to identify and isolate faults which may develop in the Oxygen Analyzer System. Refer to Probe, IFT, HPS, and MPS Appendices.

5-2. SPECIAL TROUBLESHOOTING NOTES.

a. Grounding. It is essential that adequate grounding precautions are taken when the system is being installed. A very thorough check must be made at both the probe and electronics to ensure that the grounding quality has not degraded during fault finding. The system provides facilities for 100% effective grounding and the total elimination of ground loops.

b. Electrical Noise. The IFT has been designed to operate in the type of environment normally found in a boiler room or control room. Noise suppression circuits are employed on all field terminations and main inputs. When fault finding, the electrical noise being generated in the immediate circuitry of a faulty system should be evaluated. All cable shields must be connected to earth.

c. Loose Integrated Circuits. The IFT uses a microprocessor and supporting integrated circuits. Should the electronics unit receive rough handling during installation in a location where it is subjected to severe vibration, an Integrated Circuit (IC) could work loose. The fault finding guides in paragraph 5-3a. and Table 2-1 Appendix E, show the resulting variety of failure modes. It is recommended that all IC's be confirmed to be fully seated before troubleshooting on the system begins.

d. Electrostatic Discharge. Electrostatic discharge can damage the IC's used in the electronics unit. It is essential before removing or handling the processor board or the IC's used on it, that the user ensure he/she is at ground potential.

5-3. SYSTEM TROUBLESHOOTING. The IFT provides system failure information with two different error message formats. The error messages vary due to system configuration. Refer to Appendix E, Section II, IFT 3000 Troubleshooting.

- a. GUI Equipped IFT.** The status line of the GUI equipped IFT will display one of ten conditions: OK, CAL (calibration), C Err (calibration error), H Err (heater error), TGLow (test gas low), HiO₂ (high O₂ level), LoO₂ (low O₂ level), and R Hi (high resistance level), Off and PRBE. Refer to Table 2-1, Appendix E for additional troubleshooting information on the GUI equipped IFT.

WARNING

Consult Safety Data Sheet 1M03296 before performing any work on the CENELEC approved IFT 3000.

1. OK - The system is operating normally.
2. CAL - The system is currently undergoing calibration.
3. C Err - An error was detected during the calibration process.
4. H Err - There is a fault within the heater system.
5. TGLow - There is no test gas pressure.
6. HiO₂ - The O₂ value is above the high alarm limit.
7. LoO₂ - The O₂ value is below the low alarm limit.
8. R Hi - The cell resistance is above the high limit.
9. Off - The probe has been turned off because the IFT cannot control the heater temperature.
10. PRBE - The probe is disconnected, cold, or leads are reversed.

SECTION VI. RETURNING EQUIPMENT TO THE FACTORY

6-1. If factory repair of defective equipment is required, proceed as follows:

- a.** Secure a return authorization number from a Rosemount Analytical Sales Office or Representative before returning the equipment. Equipment must be returned with complete identification in accordance with Rosemount instructions, or it will not be accepted.

In no event will Rosemount be responsible for equipment returned without proper authorization and identification.

- b.** Carefully pack defective unit in a sturdy box with sufficient shock absorbing material to insure that no additional damage will occur during shipping.

- c.** In a cover letter, describe completely:

1. The symptoms from which it was determined that the equipment is faulty.
2. The environment in which the equipment has been operating (housing, weather, vibration, dust, etc.).
3. The site from which equipment was removed.
4. Whether warranty or nonwarranty service is requested.
5. Complete shipping instructions for return of replacement or repaired equipment to you.
6. Reference the return authorization number.

- d.** Enclose a cover letter and purchase order and ship the defective equipment, according to instructions provided in Rosemount Return Authorization, prepaid, to:

European

Rosemount Ireland
Equipment Return Repair Dept.
151 Shannon Industrial Estate
Co. Clare
Ireland

American

Rosemount Analytical Inc.
RMR Department
1201 N. Main Street
Orrville, Ohio 44667

If warranty service is requested, the defective unit will be carefully inspected and tested at the factory. If failure was due to conditions listed in the standard Rosemount warranty, the defective unit will be repaired or replaced at Rosemount's option, and an operating unit will be returned to the customer in accordance with shipping instructions furnished in the cover letter.

For equipment no longer under warranty, the equipment will be repaired at the factory and returned as directed by your purchase order and shipping instructions.

INDEX

This index is an alphabetized listing of parts, terms, and procedures having to do with the World Class 3000 Oxygen Analyzer with IFT 3000 Intelligent Field Transmitter. Every item listed in the index refers to a location in the manual by page number or numbers.

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**APPENDIX AX
WORLD CLASS 3000
OXYGEN ANALYZER
PROBE (CENELEC
APPROVED VERSION)**

Instruction Bulletin IB-106-300NX Series Rev. 2

ROSEMOUNT[®] ANALYTICAL

FISHER-ROSEMOUNT[™] Managing The Process Better.[™]

HIGHLIGHTS OF CHANGES

Effective June, 1997 Rev. 2

PAGE	SUMMARY
--	General. Added snubber version of probe to manual. Text and art changed as necessary to reflect new style probe.

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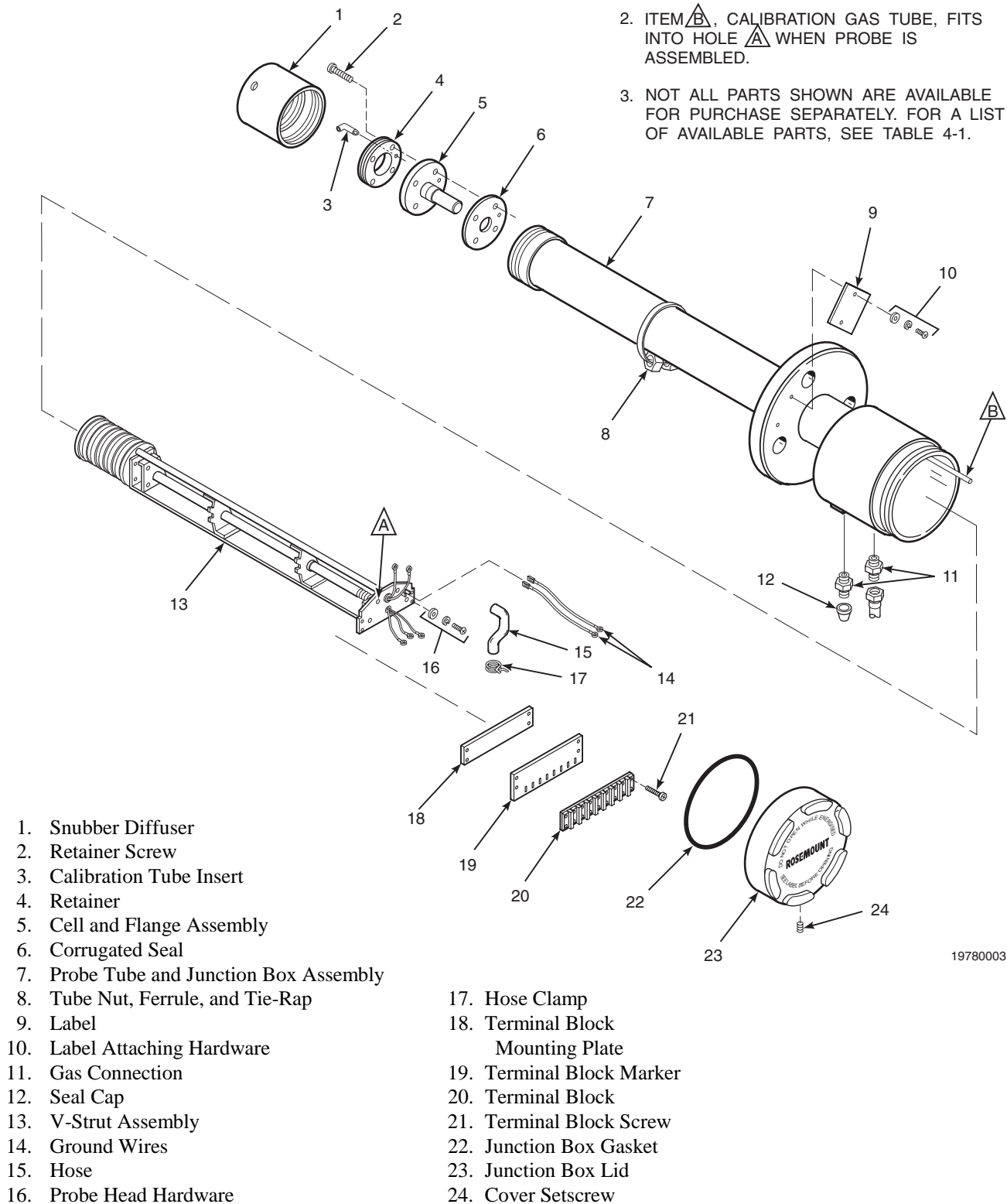
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NOTES: 1. SEE SAFETY DATA SHEET 1M03226 FOR A LIST OF PROBE REPAIRS A CUSTOMER MAY MAKE.

2. ITEM ΔB , CALIBRATION GAS TUBE, FITS INTO HOLE ΔA WHEN PROBE IS ASSEMBLED.

3. NOT ALL PARTS SHOWN ARE AVAILABLE FOR PURCHASE SEPARATELY. FOR A LIST OF AVAILABLE PARTS, SEE TABLE 4-1.



19780003

Figure 1-1. Oxygen Analyzer (Probe - CENELEC Approved) Exploded View

SECTION I. DESCRIPTION

WARNING

Consult Safety Data Sheet 1M03226 for probe safety related information.

1-1. OXYGEN ANALYZER (PROBE) - GENERAL.

The CENELEC approved Oxygen Analyzer (Probe), Figure 1-1, consists of three component groups (Figure 1-2): probe exterior, inner probe, and probe head. Specifications for the CENELEC approved probe are contained in Table 1-1.

1-2. PROBE ASSEMBLY EXTERIOR. Primary probe exterior components include a flange-mounted zirconium oxide cell, mounted on a tube assembly and protected by a flame arrestor and snubber diffuser.

- a. **Cell and Flange Assembly.** The primary component in the cell and flange assembly, Figure 1-3, is a yttria-stabilized zirconium oxide cell. It creates an electrical signal when the

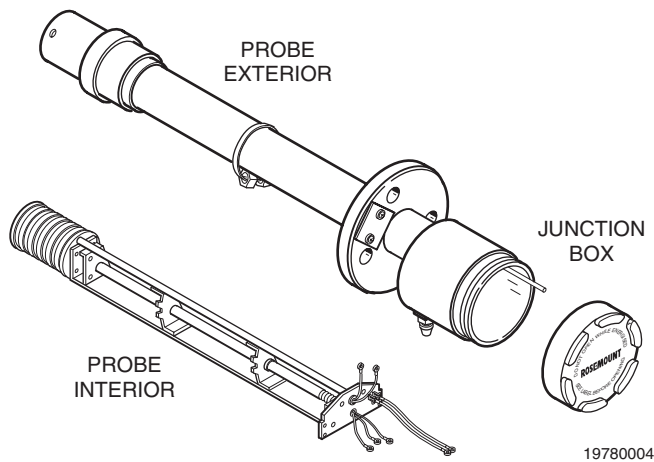


Figure 1-2. Main Probe Components

oxygen level on one side is out of balance with the oxygen level on the other side. This signal is proportional to the difference in oxygen levels.

- b. **Probe Tube Assembly.** Screws and a retainer ring secure the cell and flange assembly, Figure 1-3, to the probe tube assembly. When in place, the cell is inside the tube. The retainer ring is high temperature chrome plated to prevent galling and seizing. It is also coated with anti-seize compound to help avoid seizing.

The tube assembly includes a flange which mates with a stack-mounted flange. Studs on the stack flange make installation easy. There is also a tube to carry calibration gas from the probe head to the process side of the cell during calibration.

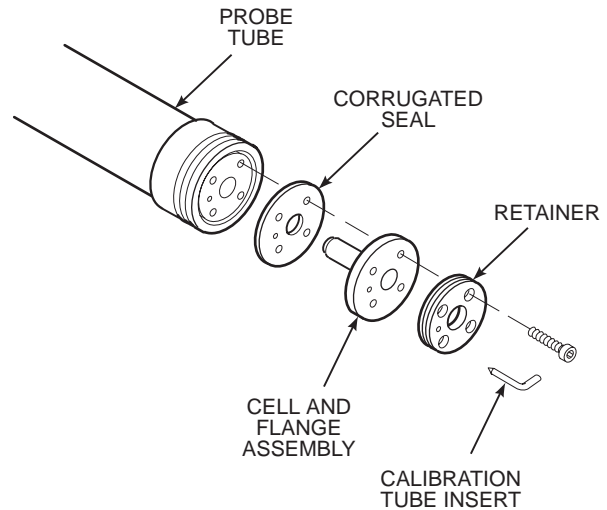


Figure 1-3. Cell and Tube Assemblies

Table 1-1. Specifications for Oxygen Analyzing Equipment^{1, 2}.

Probe lengths, nominal	457 mm (18 in.), 0,91 m (3 ft), 1,83 m (6 ft), depending on duct dimensions.
Temperature limits in process measurement area	10-704 °C (50-1300 °F)
Standard/current output	4-20 mA dc signal (factory set)
O ₂ indication (Digital display and analog output)	0.1% O ₂ or ±3% of reading, whichever is greater using Rosemount test gases.
Cell speed of response	1 millisecond
System speed of response	less than 3 seconds (amplifier output)
Resolution sensitivity	0.01% O ₂ transmitted signal
Probe reference air flow	56,6 L/hr (2 scfh) clean, dry, instrument quality air (20.95% O ₂)
Calibration gas mixtures	Rosemount Hagan Test Gas Kit Part No. 6296A27G01 contains 0.4% O ₂ N ₂ Nominal and 8% O ₂ N ₂ Nominal
Calibration gas flow	141,6 L/hr (5 scfh)
Probe heater power supply	44 Vac from HPS 3000
HPS 3000 power requirement	225 VA
Ambient operating temperature of probe junction box	0°-150°C (32°-302°F)
HPS 3000 ambient operating temperature	0°-50°C (32°-120°F)
Approximate shipping weights:	
457 mm (18 in.) package	30 kg (66 lbs)
0,91 m (3 ft) package	40 kg (88 lbs)
1,83 m (6 ft) package	55 kg (121 lbs)

¹ All static performance characteristics are with operating variables constant.

² Temperatures over 537°C (1000°F) may affect the ease of field cell replaceability.

- c. **Flame Arrestor Diffuser.** The flame arrestor diffuser, Figure 1-4, protects the cell from heavy particles and isolates the cell from changes in temperature. The assembly consists of a flame arrestor and a snubber diffuser. The flame arrestor and diffuser thread onto the probe tube. Pin spanner wrenches (probe disassembly kit 1L03825G01) are applied to holes in the diffusion element hub to remove or install the diffuser assembly.

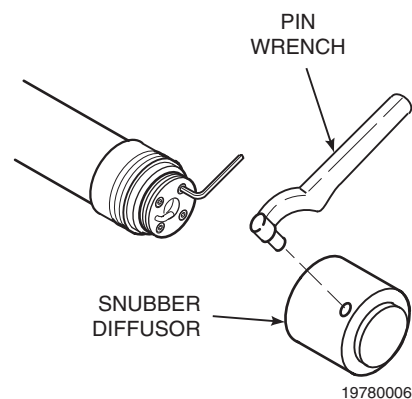


Figure 1-4. Flame Arrestor Diffuser Assembly

WARNING

The Flame Arrestor and Flame Arrestor Hub are among the critical components in this type of protection (Flameproof Enclosure Type 'D'). See Safety Data Sheet 1M03226.

Systems that use an abrasive shield require a special flame arrestor and diffuser assembly with a hub that is grooved to accept two dust seal gaskets.

- d. **Cell - General.** The components which make up the cell are machined to close tolerances and assembled with care to provide accurate oxygen measurements. Any replacement requires attention to detail and care in assembly to provide good results.

WARNING

Failure to follow the instructions in this manual could cause danger to personnel and equipment. Read and follow instructions in this manual carefully.

The oxygen probe includes an inner electrode for the cell assembly. It consists of a platinum pad and a platinum/inconel composite wire which produces the cell constant offset voltage described in the Nernst equation.

With this pad and wire, the constant will be between -10 to +15 mV. The cell constant is noted in the calibration data sheet supplied with each probe.

Every probe should be calibrated and checked after repair or replacement of cell, pad and wire, heater, or thermocouple, or after disassembly of the probe.

1-3. INNER PROBE ASSEMBLY. The inner probe assembly, Figure 1-5, consists of six main parts:

- a. Ceramic support rod with four holes running through the length. The holes serve as insulated paths for the cell signal wire and thermocouple wires.
- b. A heater that is helically wrapped on a quartz support cylinder and insulated.
- c. A chromel-alumel thermocouple which acts as the sensing element for the temperature controller. (Not visible in Figure 1-4; located within ceramic support rod.)

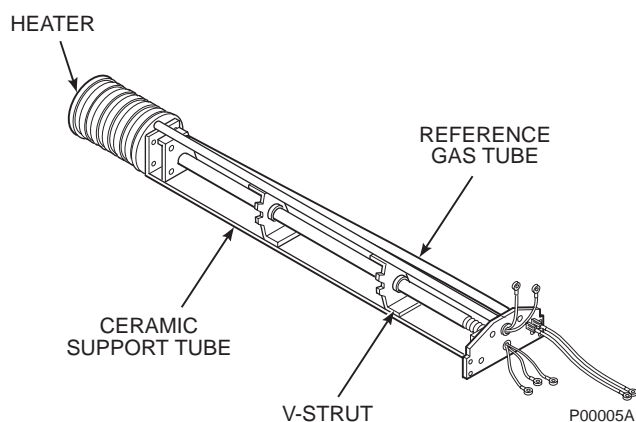


Figure 1-5. Inner Probe Assembly

- d. A platinum screen pad which forms electrical contact with the inner electrode of the electrochemical cell. (Not visible in Figure 1-5; located at end of ceramic support rod.) The pad is attached to an inconel wire which carries the signal to the terminal strip.
- e. A V-strut assembly to give support to the inner probe assembly.
- f. A tube to carry reference gas to the cell.

Turn to Section III, Service and Normal Maintenance for repair procedures for probe components.

1-4. JUNCTION BOX. The junction box, Figure 1-6, is positioned at the external end of the probe and contains a terminal strip for electrical connections and fittings for reference and calibration gases. Fittings are for 0.250 inch stainless steel tubing. The calibration fitting has a seal cap which must remain in place except during calibration. A tubing fitting is also supplied to be used with the calibration gas supply during calibration.

If the calibration gas bottles will be permanently hooked up to the probe, an optional check valve is recommended to prevent condensation of flue gas in the calibration lines.

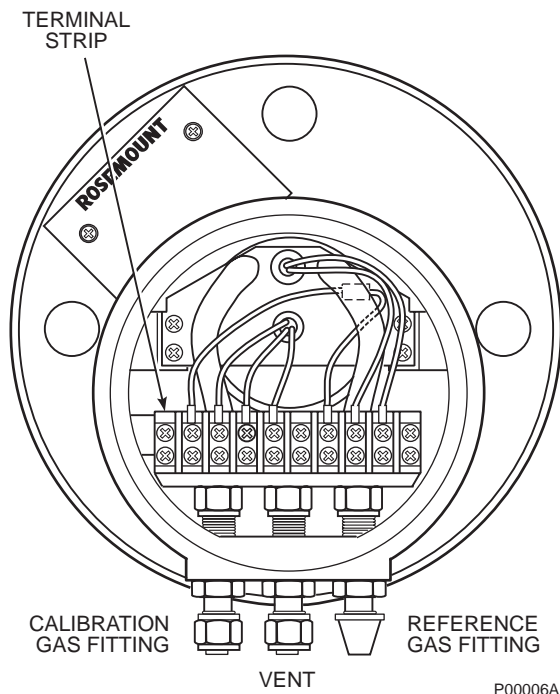


Figure 1-6. Junction Box

During operation and calibration, reference gas is supplied through the reference gas fitting to the reference side of the cell. This gives the system a known quantity of oxygen with which to compare the oxygen level in the process gas. Unlike the non-CENELEC World Class 3000 Probe, reference air must be used in conjunction with the CENELEC World Class 3000 probe.

During calibration, two gases of different known oxygen concentrations are injected one at a time through the calibration gas fitting. Stainless steel tubing delivers this gas to the process side of the cell. In a healthy cell, the difference in oxygen pressure from the process side to the reference side of the cell will cause a millivolt output proportional to the difference in oxygen levels. The electronics unit can use the two millivolt outputs caused by the two calibration gases for either automatic or semi-automatic calibration.

CAUTION

Do not attempt to remove a process gas sample through either gas fitting. Hot gases from the process would damage gas hoses in the probe head.

- 1-5. CABLE ASSEMBLY.** Cable used to interconnect apparatus must conform to the applicable codes of practice in the country of installation (example: BS4345 in Great Britain). Rosemount can supply a cable (P/N 1U03066) which is fitted with EExd IIC barrier glands. The installer should note that on some earlier versions of the cable, the glands, although EExd IIC approved, are not of the barrier gland variety. These glands should not be used. Rosemount can supply a gland kit for the corresponding barrier gland (P/N 1U03066G07). Each kit contains one pair of glands. The Rosemount supplied cable is a 7 conductor cable to connect the probe to the HPS 3000, and to connect the HPS 3000 to the electronics

package. Standard length for this cable is 6 m (20 ft), but lengths up to 45 m (150 ft) are available. The 7 conductors include 1 shielded pair of wires for the cell millivolt signal, 1 shielded pair of type K wires for the thermocouple, and 3 individual 16-gauge wires for the heater and for ground. All metal shields are isolated at the probe end and connect by drain wires to ground at the electronics. The cable is suitable for use in ambient temperatures up to 90°C (194°F).

1-6. PROBE OPTIONS.

- a. Abrasive Shield Assembly.** The abrasive shield assembly (IB-106-300NX Series, Figure 2-1) is a stainless-steel tube that surrounds the probe assembly. The shield protects the probe against particle abrasion and corrosive condensations, provides a guide for ease of insertion, and acts as a probe position support, especially for longer length probes. The abrasive shield assembly uses a modified flame arrestor and diffuser filled with dual dust seal packing.
- b. Bypass Probe Options.** For processes where the flue gas exceeds the maximum allowable temperature of 704°C (1300°F) a bypass sensor package can be employed. The bypass system uses an 18 inch probe mounted externally on the stack or duct. The process or exhaust gases are directed out to the probe through an extension/return duct. The bypass arrangement does not require the use of aspiration air and the gas which flows past the probe is returned to the stack or duct.

The bypass probe package is normally used for process temperatures of 704°C (1300°F) to 980°C (1800°F). "Inconel 600" has an operating range up to 980°C (1800°F).

Overall dimensions and mounting details of the bypass system are shown in Figure 1-7.

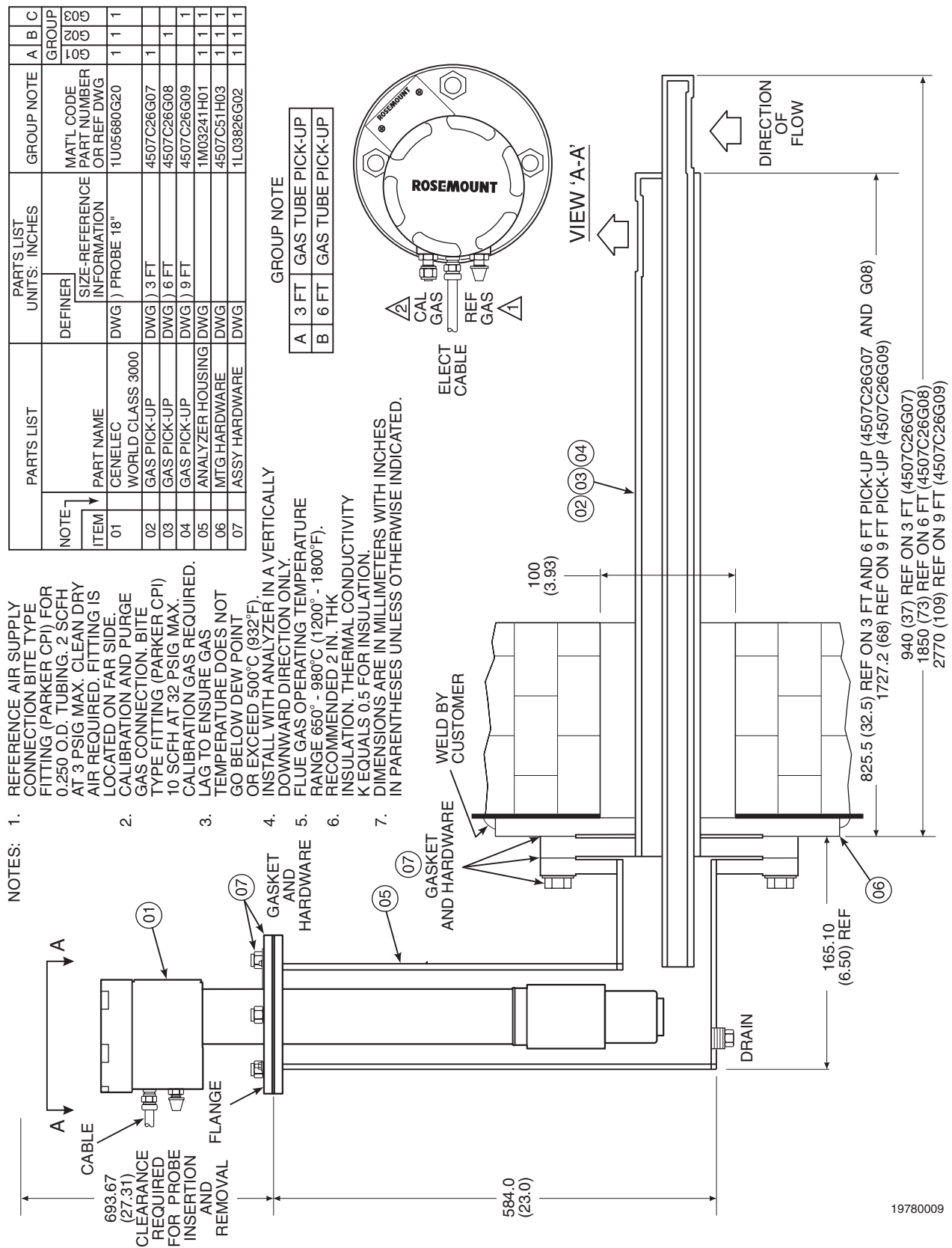


Figure 1-7. Bypass Probe Option

SECTION II. PROBE TROUBLESHOOTING

WARNING

Before conducting any work on the probe, consult probe Safety Data Sheet 1M03226.

WARNING

Install all protective equipment covers and safety ground leads after troubleshooting. Failure to replace covers and ground leads could result in serious injury or death.

- 2-1. OVERVIEW.** The probe troubleshooting section describes how to identify and isolate operating faults which may develop in the probe assembly.

2-2. PROBE TROUBLESHOOTING.

- a. Probe Faults.** The three symptoms of probe failure are:
1. The system does not respond to changes in the oxygen concentration.
 2. The system responds to oxygen changes but does not give the correct indication.
 3. The system does not give an acceptable indication of the value of the oxygen test gas being applied during calibration.
- b.** Table 2-1 provides a guide to fault finding for the above symptoms.
- c.** Figures 2-1 and 2-2 provide an alternate approach to finding probe related problems.

Table 2-1. Fault Finding.

SYMPTOM	CHECK	FAULT	REMEDY
<p>1. No response to oxygen concentration change when:</p> <p>Heater is cold and TC mV output is less than setpoint.</p> <p>Heater is hot and T/C mV output is at setpoint ± 0.2 mV.</p>	<p>Thermocouple continuity</p> <p>Heater cold resistance to be 11 ohm - 14 ohm</p> <p>Triac O/P to heater</p> <p>Recorder chart</p> <p>Cell mV input to electronics <u>and</u> cell mV at probe junction box</p>	<p>Thermocouple failure</p> <p>Heater failure</p> <p>Failure of electronics</p> <p>Recorder failure</p> <p>No cell mV at probe when test gas applied</p> <p>Probe cell mV OK but no input to electronics</p> <p>Cell mV satisfactory both at probe junction box and input to electronics - failure of electronics</p>	<p>Replace thermocouple or return probe to Rosemount.</p> <p>Replace heater or return probe to Rosemount.</p> <p>Check HPS and electronics package.</p> <p>See Recorder Instruction Manual.</p> <p>Replace cell or return probe to Rosemount.</p> <p>Check out cable connection.</p> <p>Check electronics package.</p>
<p>2. System responds to oxygen concentration changes <u>but</u> does not give correct indication.</p> <p>Good response, with incorrect indication.</p>	<p>Recorder or remote indicator</p> <p>System calibration</p> <p>Probe mounting and condition of duct</p> <p>Cell mV input to electronics</p>	<p>Calibration error</p> <p>Calibration error</p> <p>Air ingress into duct</p> <p>Failure of electronics</p>	<p>Recalibrate recorder or indicator, reference Recorder Instruction Manual.</p> <p>Recalibrate system.</p> <p>Stop air leaks or resite probe.</p> <p>Check electronics package.</p>
<p>3. Probe does not give accurate indication of applied test gas.</p>	<p>Test gas input port</p> <p>Ceramic diffusion element</p>	<p>Blocked port</p> <p>Diffusion element cracked, broken, or missing</p>	<p>Clean port.</p> <p>Replace diffusion element.</p>

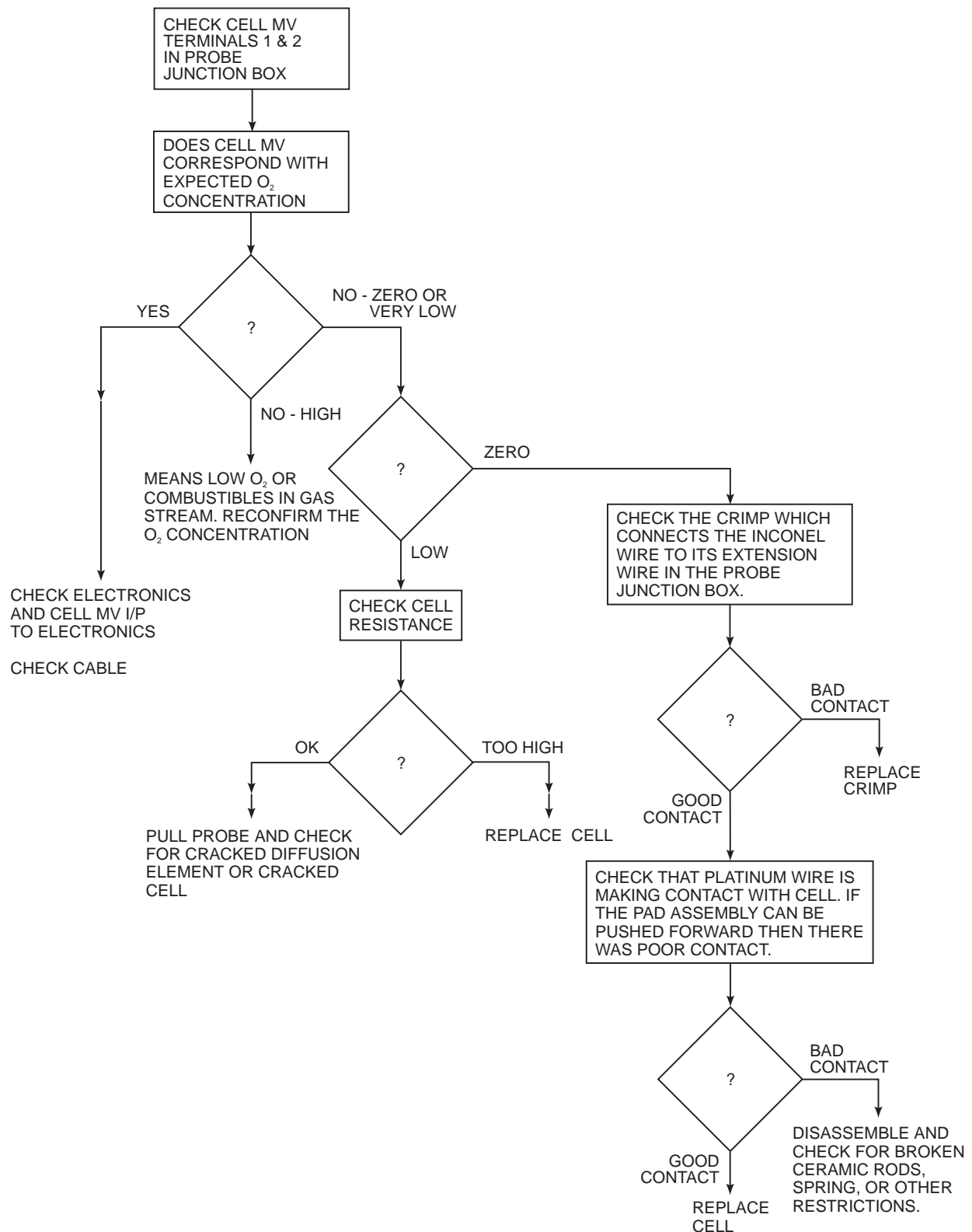
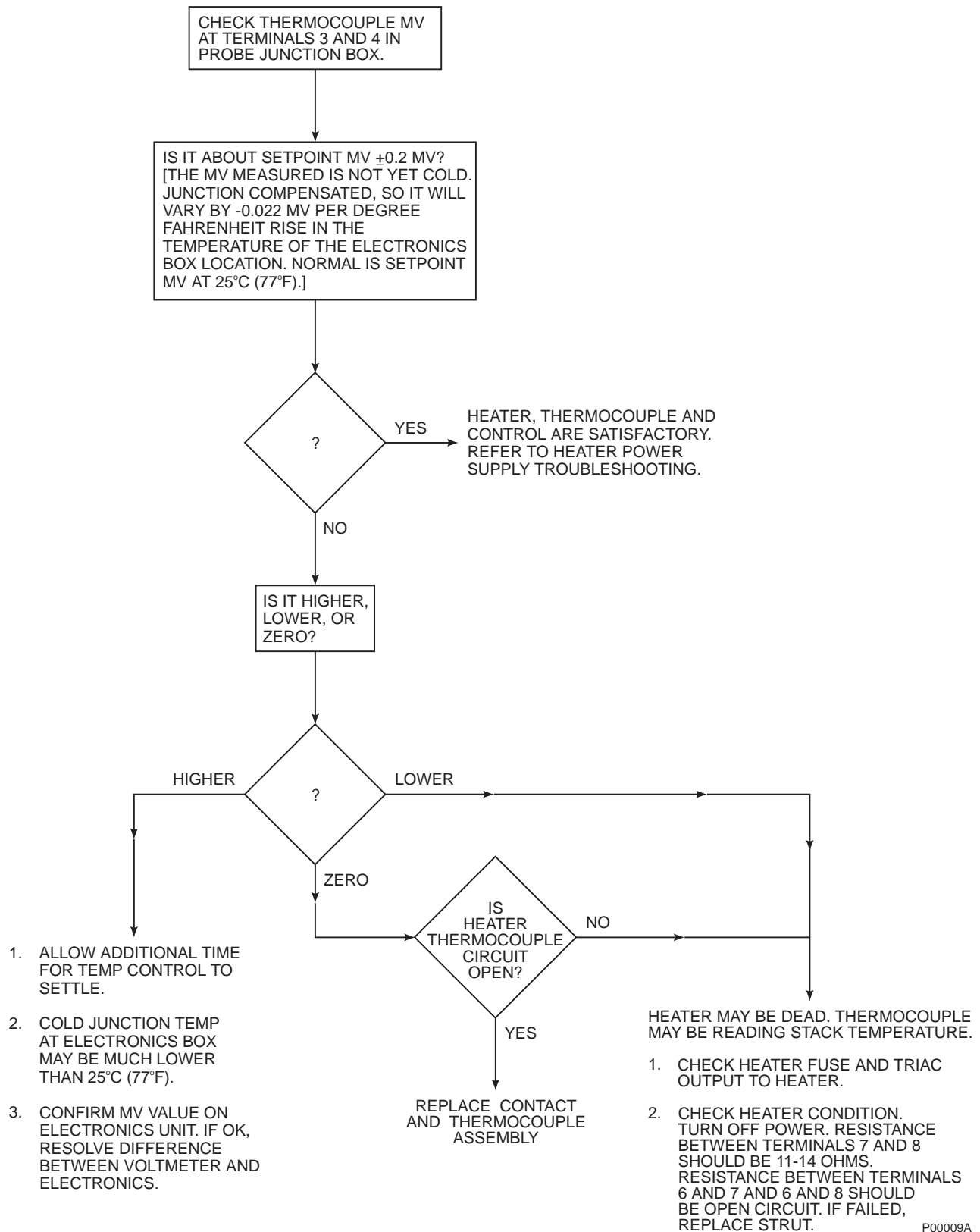


Figure 2-1. Flowchart of Probe Related Problems, #1



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Figure 2-2. Flowchart of Probe Related Problems, #2

SECTION III. SERVICE AND NORMAL MAINTENANCE



NOTE

Upon completing installation, make sure that the probe is turned on and operating prior to firing up the combustion process. Damage can result from having a cold probe exposed to the process gases.

During outages, and if possible, leave all probes running to prevent condensation and premature aging from thermal cycling.

CAUTION

If the ducts will be washed down during outage, **MAKE SURE** to power down the probes and remove them from the wash area.

WARNING

Before carrying out any service or maintenance on the probe, consult Safety Data Sheet 1M03226.

When working on this equipment on the laboratory bench, be aware that the probe, probe tube, and flame arrestor hub can be hot [up to 370 °C (698 °F)] in the region of the probe heater.

WARNING

Install all protective equipment covers and safety ground leads after equipment repair or service. Failure to install covers and ground leads could result in serious injury or death.

3-1. **OVERVIEW.** This section describes routine maintenance of the oxygen analyzer probe. Spare parts referred to are available from Rosemount. Probe disassembly kit 1LO3825G01 contains the required spanner and hex wrenches. Refer to Section IV of this appendix for part numbers and ordering information.

3-2. **PROBE RECALIBRATION.** The oxygen analyzer system should be calibrated when commissioned. Under normal circumstances the probe will not require frequent calibration. When calibration is required, follow the procedure described in the Instruction Bulletin applicable to your electronics package.

3-3. **CELL REPLACEMENT.** This paragraph covers oxygen sensing cell replacement. Do not attempt to replace the cell until all other possibilities for poor performance have been considered. If cell replacement is needed, order cell replacement kit, Table 4-1.

The cell replacement kit contains a cell and flange assembly, corrugated seal, calibration tube insert, setscrews, socket head cap screws, and anti-seize compound. Items are carefully packaged to preserve precise surface finishes. Do not remove items from packaging until they are ready to be used. Spanner wrenches and hex wrenches needed for this procedure are part of an available special tools kit, Table 4-1.

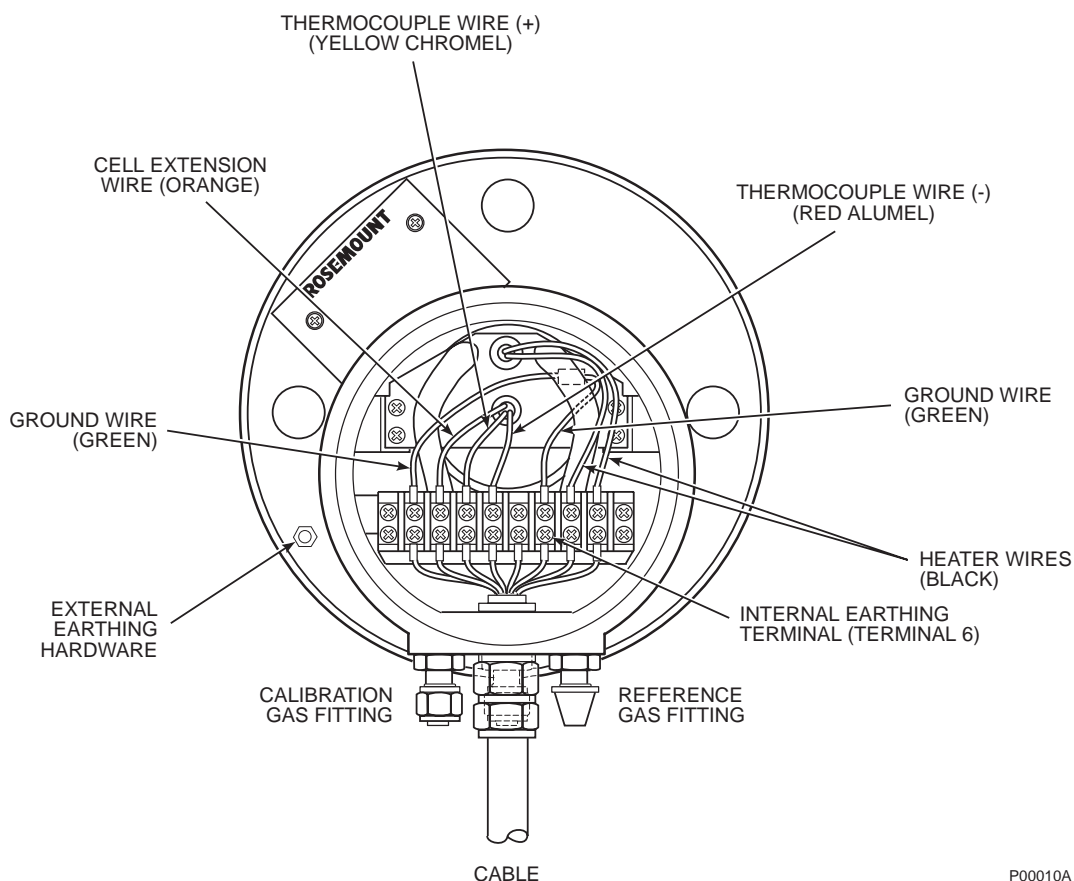
WARNING

Before carrying out this procedure, consult Safety Data Sheet 1M03226.

Wear heat resistant gloves and clothing to remove probe from stack. Normal operating temperatures of diffuser and vee deflector are approximately 316° to 427 °C (600° to 800 °F). They could cause severe burns.

CAUTION

Do not remove cell unless it is certain that replacement is needed. Removal may damage cell and platinum pad. Go through complete troubleshooting procedure to make sure cell needs replacement before removing it.



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Figure 3-1. Cell Wiring Installation

- a. Follow the power down procedure outlined in Safety Data Sheet 1M03226 and the official "Codes of Practice" for your country of installation. Shut off and disconnect reference gas and calibration gas supplies from probe junction box, Figure 3-1. Wearing heat resistant gloves and clothing, remove probe assembly from stack carefully and allow to cool to room temperature. Do not attempt to work on unit until it has cooled to a comfortable working temperature.
- b. The vee deflector is an option used with the ceramic diffuser. Figure 3-2 shows a probe with a snubber diffuser. If the probe has the vee deflector, remove vee deflector and hub setscrews and remove vee deflector. Use spanner wrenches from probe disassembly tools kit, Table 4-1, to turn hub free from probe tube. If applicable, inspect optional ceramic diffusion element. If damaged, replace element.
- c. Loosen 4 socket head screws from retainer. Pull off retainer and calibration tube insert, Figure 3-3. Discard calibration tube insert.

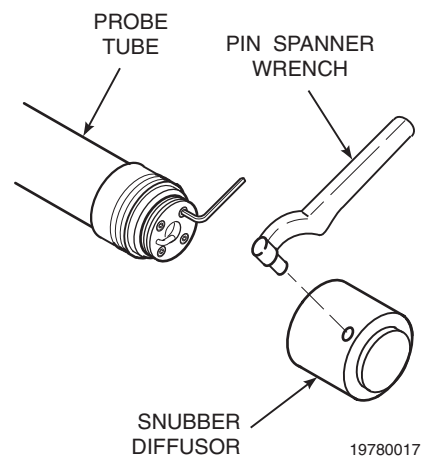


Figure 3-2. Removal of Snubber Diffuser

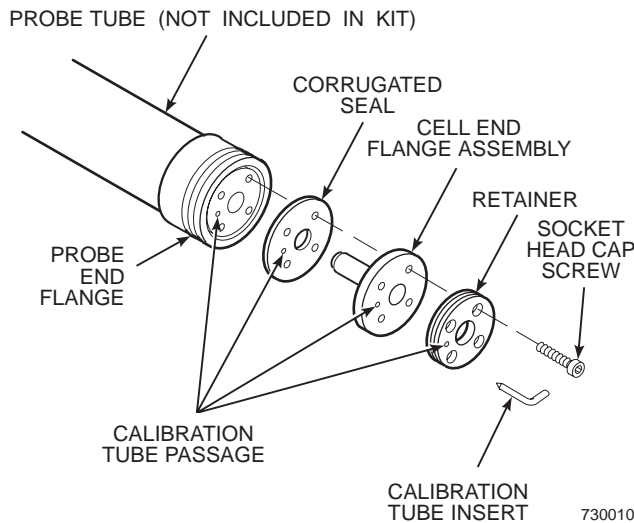


Figure 3-3. Cell Replacement Kit

- d. Press the cell flange against the probe end flange and twist through 90° in both the clockwise and counterclockwise directions. This breaks the bond between the cell and the platinum pad. Once the bond is broken, remove the cell.
- e. View the platinum pad through the probe end flange. Reform the platinum pad into a shape to match the cell electrode by gathering in any loose strands which may have become untidy. This may be done with a small flat screwdriver.
- f. Remove and discard corrugated seal. Clean mating faces of probe tube and retainer. Remove burrs and raised surfaces with block of wood and crocus cloth.
- g. Rub one or two drops of anti-seize compound #3535B53G01 between fingers. Smear on both sides of corrugated seal.
- h. Install new calibration tube insert in retainer, with the short arm of the tube insert penetrating the calibration gas passage in the outer ring of the retainer. Assemble retainer, cell and flange assembly, corrugated seal, and probe tube. Make sure the calibration tube insert lines up with the calibration gas passage in each component. Firmly seat the calibration tube insert in the assembly. Apply a small amount of anti-seize compound to screw threads and use screws to secure assembly. Torque to 4 N•m (35 in-lbs).
- i. To install snubber diffuser, apply anti-seize compound to threads of probe tube, Figure 3-2, and snubber diffuser. Reinstall diffuser on probe tube. Using pin spanner wrenches, torque to 14 N•m (10 ft-lbs).

- j. If using the optional vee deflector and ceramic hub, apply anti-seize compound to threads of probe end flange, hub, and setscrews. Reinstall hub on probe tube. Using pin spanner wrenches, torque to 14 N•m (10 ft-lbs). Reinstall vee deflector, orienting apex toward gas flow. Secure with setscrews and anti-seize compound. Torque to 2.8 N•m (25 in-lbs). Secure hub retaining setscrew.
- k. On systems equipped with an abrasive shield, install dust seal gaskets, with joints 180° apart.
- l. Reinstall probe and gasket on stack flange. If there is an abrasive shield in the stack, make sure dust seal gaskets are in place as they enter 15° reducing cone.
- m. Consult Safety Data Sheet 1M03226 then turn power on to electronics and monitor thermocouple output. It should stabilize at 29.3 mV ±0.2 mV. Set reference air flow at 56.6 L/hr (2 scfh). After probe stabilizes, calibrate probe per Instruction Bulletin applicable to your electronics package. If new components have been installed, repeat calibration after 24 hours of operation.

3-4. CERAMIC DIFFUSION ELEMENT REPLACEMENT.

NOTE

This refers to ceramic diffuser element only.

- a. **General.** The diffusion element protects the cell from particles in process gases. It does not normally need to be replaced because the vee deflector protects it from particulate erosion. In severe environments, the filter may be broken or subject to excessive erosion. Examine the ceramic diffusion element whenever removing the probe for any purpose. Replace if damaged.

Damage to the ceramic diffusion element may become apparent during calibration. Compare probe response with previous response. A broken diffusion element will cause a slower response to calibration gas.

Hex wrenches needed to remove setscrews and socket head screws in the following procedure are available as part of a Probe Disassembly Kit, Table 4-1.

WARNING

Wear heat resistant gloves and clothing to remove probe from stack. Normal operating temperatures of diffuser and vee deflector are approximately 316° to 427°C (600° to 800°F). They can cause severe burns.

Before carrying out this procedure, consult Safety Data Sheet 1M03226.

CAUTION

Do not remove cell unless it is certain that replacement is necessary. Cell cannot be removed for inspection without damaging it.

b. Replacement Procedure.

1. Follow the power down procedure outlined in Safety Data Sheet 1M03226 and the official "Codes of Practice" for your country of installation. Disconnect cable conductors and remove cable, Figure 3-1. Shut off and disconnect reference gas and calibration gas supplies from probe junction box. Wearing heat resistant gloves and clothing, carefully remove probe assembly from stack.
2. Loosen setscrews, Figure 3-4, using hex wrench from Probe Disassembly Kit, Table 4-1 and remove vee deflector. Inspect setscrews. If damaged, replace with stainless setscrews coated with anti-seize compound.

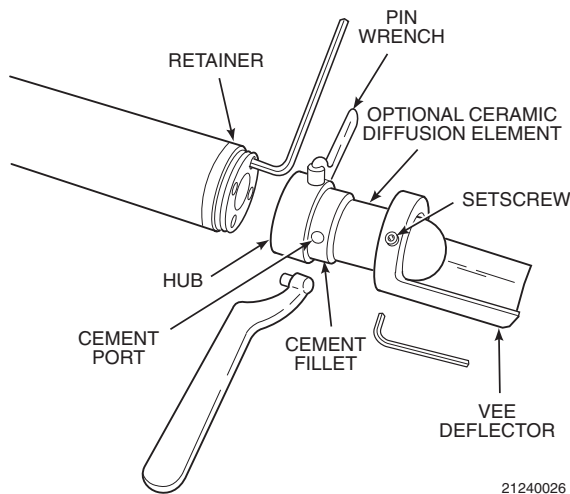


Figure 3-4. Removal of Optional Ceramic Diffuser and Vee Deflector

3. On systems equipped with abrasive shield, remove dual dust seal gaskets.
4. Use spanner wrenches from Probe Disassembly Kit, Table 4-1, to turn hub free from retainer.
5. Put hub in vise. Break out old ceramic diffusion element with chisel along cement line and 9.5 mm (3/8 in.) pin punch through cement port.
6. Break out remaining ceramic diffusion element by tapping lightly around hub with hammer. Clean grooves with pointed tool if necessary.
7. Replace ceramic diffusion element, using replacement kit in Table 4-1. This consists of a diffusion element, cement, setscrews, anti-seize compound and instructions.
8. Test fit replacement ceramic diffusion element to be sure seat is clean.

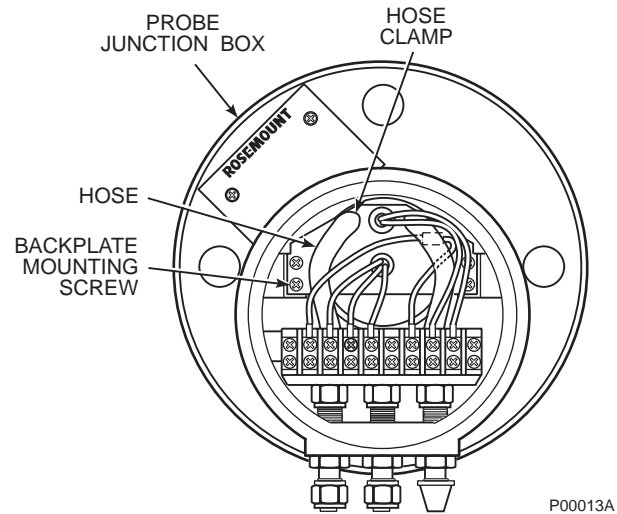
CAUTION

Do not get cement on ceramic diffusion element except where it touches the hub. Any cement on ceramic diffusion element blocks airflow through element. Wiping wet cement off of ceramic only forces cement into pores. Also do not get any cement onto the flame arrestor element.

9. Thoroughly mix cement and insert tip of squeeze bottle into cement port. Tilt bottle and squeeze while simultaneously turning ceramic diffusion element into seat. Do not get any cement on upper part of ceramic diffusion element. Ensure complete penetration of cement around 3 grooves in hub. Cement should extrude from opposite hole. Wipe excess material back into holes and wipe top fillet of cement to form a uniform fillet. (A Q-Tip is useful for this.) Clean any excess cement from hub with water.
10. Allow filter to dry at room temperature overnight or 1 to 2 hours at 93°C (200°F).

11. Wipe a heavy layer of anti-seize compound onto the threads and mating surfaces of the flame arrestor, diffusion hub, and probe tube.
12. Assemble flame arrestor and diffusion hub with two pin spanner wrenches. Torque to 14 N•m (10 ft-lbs). Secure with hub retaining setscrew.
13. On systems equipped with abrasive shield, install dust seal gaskets with joints 180° apart.
14. Reinstall vee deflector, orienting apex toward gas flow. Apply anti-seize compound to setscrews and tighten with hex wrench.
15. Reinstall probe on stack flange.
16. Consult Safety Data Sheet 1M03226 then turn power on to electronics and monitor thermocouple output. It should stabilize at 29.3 mV \pm 0.2 mV. Calibrate probe per Instruction Bulletin applicable to your electronics package.

- b. Use a pencil to mark locations of spring clips on ceramic rod, Figure 3-6.
- c. Pry or squeeze tabs on spring clips, and pull contact and thermocouple assembly out of probe assembly. Retain spring clips and spring; replace if damaged.



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Figure 3-5. Probe Junction Box Mechanical Connections

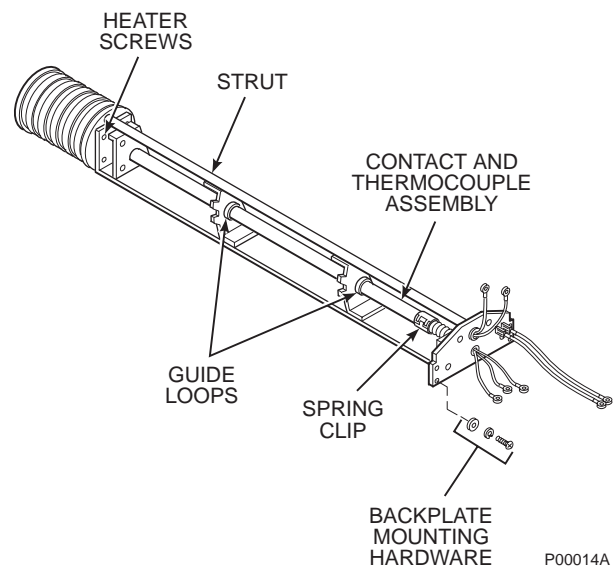
3-5. REPLACEMENT OF CONTACT AND THERMOCOUPLE ASSEMBLY.

WARNING

Use heat resistant gloves and clothing when removing probe junction box and inner probe assembly. Do not attempt to work on these components until they have cooled to room temperature. Probe components can be as hot as 800°C (1500°F). This can cause severe burns.

Before carrying this procedure, consult Safety Data Sheet 1M03226.

- a. Follow the cell removal procedure in paragraph 3.3, steps a, b, c, and d. Using heat resistant gloves and clothing, remove cover setscrew (24, Figure 1-1) and junction box lid (23). Squeezing tabs on hose clamps, remove hoses from inner probe assembly, Figure 3-5. Remove 4 screws which secure the inner probe assembly to the junction box. Disconnect all inner probe assembly wires from the terminal block (Figure 3-1). Pull inner probe assembly free from junction box. Set on bench and allow to cool to room temperature.



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Figure 3-6. Inner Probe Replacement (Heater, V-Strut, and Backplate Assembly)

CAUTION

Be very careful when handling contact and thermocouple assembly. The ceramic rod in this assembly is fragile.

- d. While very carefully handling new contact and thermocouple assembly, lay old assembly next to new one. Transfer pencil marks to new rod. Throw away old contact and thermocouple assembly.
- e. Carefully guide new contact and thermocouple assembly through V-strut assembly leaf spring (3, Figure 3-7), spring (8), spring clips (9) (held open by squeezing tabs), tube supports and heater support until spring clip reaches pencil mark.
- f. Slide assembled inner probe assembly into junction box and probe tube. To align calibration gas tube with corresponding hole in backplate (A, B, Figure 1-1), insert scribe through hole in backplate and into calibration gas tube. Secure with screws. Reinstall hoses.

NOTE

The letter "A" is stamped inside the junction box close to the calibration tube. The calibration tube may fall over towards the opposite side. If it has, bring it back towards the letter "A" before inserting the inner probe assembly. Also note that there are grooves cut in the heater plates that fit over the calibration gas tube. Insert inner probe assembly gently to avoid kinking the calibration gas tube.

- g. Connect color-coded wires to proper terminals as shown in Figure 3-1. Rosemount recommends connecting the thermocouple wires directly to the terminal strip. This is because the junction of different metals at the wires and lugs and at the lugs and the terminal strip could act as additional thermocouple junctions. This could produce a voltage that would affect the thermocouple output signal.

Do not bend wires closer than 6.4 mm (1/4 in.) from end of ceramic rod. Dress wires so they do not touch sides of probe junction box.

- h. Reinstall the cell per paragraph 3.3, Steps f, g, h, i, j, and k.
- i. Consult Safety Data Sheet 1M03226 then power up system. Monitor thermocouple output. It should stabilize at setpoint mV ± 0.2 mV. Recalibrate probe per Instruction Bulletin applicable to your electronics package.

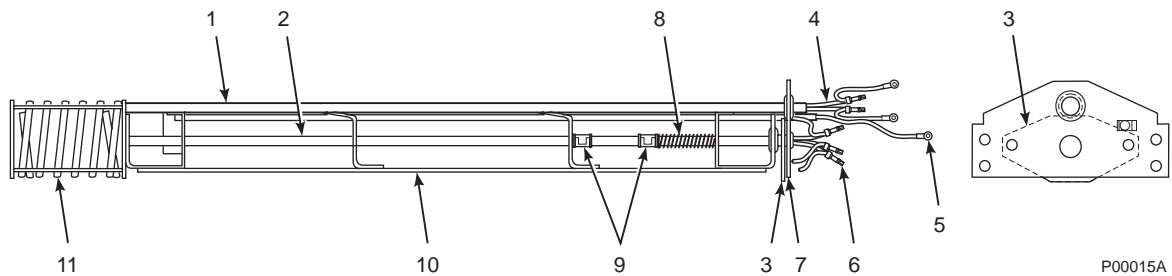
- 3-6. REPLACEMENT OF HEATER, V-STRUT AND BACKPLATE ASSEMBLY (Inner Probe Assembly; Includes Contact and Thermocouple Assembly).** Figure 3-8 is a cross-sectional view of the CENELEC approved oxygen analyzer (probe). Use Figure 3-8 and the following procedure to replace heater, v-strut, and backplate assembly.

WARNING

Before carrying out this procedure, consult Safety Data Sheet 1M03226.

Use heat resistant gloves and clothing when removing probe junction box and inner probe assembly. Do not attempt to work on these components until they have cooled to room temperature. Probe components can be as hot as 800°C (1500°F). This can cause severe burns.

- a. Follow the cell removal procedure in paragraph 3.3, steps a, b, c, and d. Using heat resistant gloves and clothing, remove cover setscrew (24, Figure 1-1) and junction box lid (23). Squeezing tabs on hose clamps, remove hoses from inner probe assembly, Figure 3-4. Remove 4 screws which secure the inner probe assembly to the junction box. Disconnect all inner probe assembly wires from the terminal block (Figure 3-1). Pull inner probe assembly free from junction box. Set on bench and allow to cool to room temperature.
- b. Slide new assembled inner probe assembly into junction box and probe tube. To align calibration gas tube with corresponding hole in backplate (A, B, Figure 1-1), insert scribe through hole in backplate and into calibration gas tube. Secure with screws. Reinstall hoses.

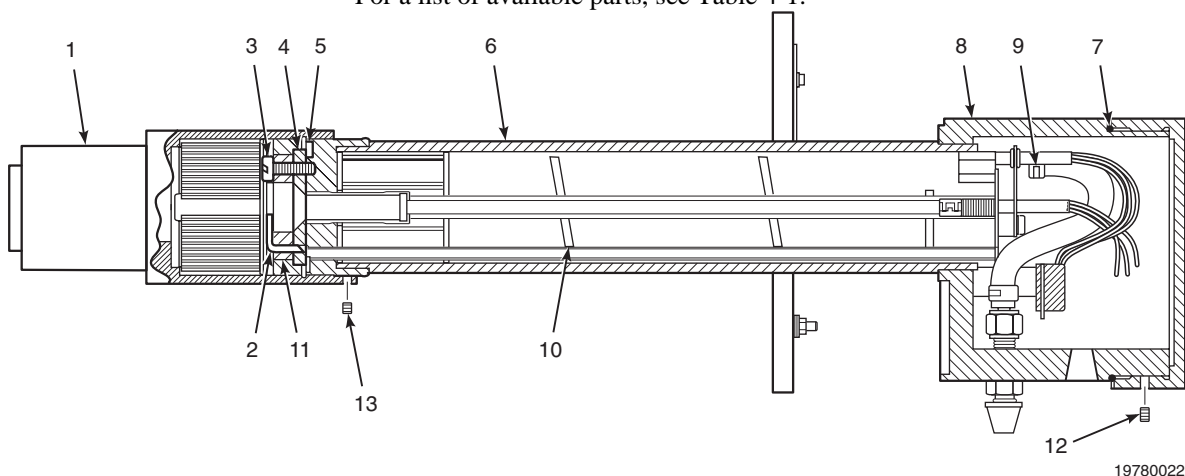


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ITEM	DESCRIPTION	ITEM	DESCRIPTION
1.	Heater Ceramic Rod	6.	Connector
2.	Contact and Thermocouple Assembly	7.	Backplate
3.	Leaf Spring	8.	Spring
4.	Extension Wire	9.	Spring Clip
5.	Ring Lug	10.	Strut
		11.	Heater

Figure 3-7. Heater, Strut, and Backplate Assembly (Inner Probe Assembly)

NOTE: Not all parts shown are available for purchase separately.
For a list of available parts, see Table 4-1.



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ITEM	DESCRIPTION	ITEM	DESCRIPTION
1.	Snubber Diffuser	8.	Cover Head Assembly
2.	Calibration Tube Insert	9.	Hose Clamp
3.	Socket Head Cap Screw 0.25 In.-28 x 0.63 (16 mm)	10.	Heater Strut
4.	Cell and Flange Assembly	11.	Retainer
5.	Corrugated Seal	12.	Junction Box Setscrew
6.	Probe Tube Assembly	13.	Flame Arrestor Hub Setscrew
7.	Gasket		

Figure 3-8. Oxygen Analyzer (Probe), Cross-Sectional View

NOTE

The letter "A" is stamped inside the junction box close to the calibration tube. The calibration tube may fall over towards the opposite side. If it has, bring it back towards the letter "A" before inserting the inner probe assembly. Also note that there are grooves cut in the heater plates that fit over the calibration gas tube. Insert inner probe assembly gently to avoid kinking the calibration gas tube.

- c. Connect color-coded wires to proper terminals as shown in Figure 3-1. Rosemount recommends connecting the thermocouple wires directly to the terminal strip. This is because the junction of different metals at the wires and lugs and at the

lugs and the terminal strip could act as additional thermocouple junctions. This could produce a voltage that would affect the thermocouple output signal.

Do not bend wires closer than 6.4 mm (1/4 in.) from end of ceramic rod. Dress wires so they do not touch sides of probe junction box.

- d. Reinstall the cell per paragraph 3.3, steps f, g, h, i, j, and k.
- e. Consult Safety Data Sheet 1M03226, then power up system. Monitor thermocouple output. It should stabilize at setpoint mV ± 0.2 mV. Recalibrate probe per Instruction Bulletin applicable to your electronics package.

SECTION IV. REPLACEMENT PARTS

Table 4-1. Replacement Parts for Probe.

FIGURE and INDEX No.	PART NUMBER	DESCRIPTION
1-1, 13	3D39149G06 ¹	V-Strut Assembly (18 in.)
1-1, 13	3D39149G07 ¹	V-Strut Assembly (3 ft)
1-1, 13	3D39149G08 ¹	V-Strut Assembly (6 ft)
3-7, 2	3534B56G04 ²	Contact and Thermocouple Assembly (18 in.)
3-7, 2	3534B56G05 ²	Contact and Thermocouple Assembly (3 ft)
3-7, 2	3534B56G06 ²	Contact and Thermocouple Assembly (6 ft)
	4847B61G19	Cell Replacement Kit (18 in.)
	4847B61G20	Cell Replacement Kit (3 ft)
	4847B61G21	Cell Replacement Kit (6 ft)
	4847B61G24	Cell Replacement Kit (No Inconel and Platinum Pad Assembly)
	1U05677G01	Probe Disassembly Kit
3-2	1U05677G04	F/A Diffuser Hub Assembly (Snubber Diffuser)
	1U05677G06	F/A Diffuser Hub Assembly (For use with Abrasive Shield)
	6292A74G02	Ceramic Diffusion Element Replacement Kit
	1N04966H02	Abrasive Shield Assembly (3 ft)
	1N04966H03	Abrasive Shield Assembly (6 ft)
	1M03241H01	90° Elbow for Bypass
1-7, 2	4507C26G07	Bypass Gas Pickup Tube (3 ft)
1-7, 3	4507C26G08	Bypass Gas Pickup Tube (6 ft)
1-7, 4	4507C26G09	Bypass Gas Pickup Tube (9 ft)
	263C152G01	Reference Gas Air Set
	771B635H01	Calibration Gas Rotameter
	1L03650H01	F/A Diffusion Hub Setscrew
	IB-106-300NFX	Instruction Bulletin (IFT)
	IB-106-300NCX	Instruction Bulletin (CRE)
	IB-106-300NEX	Instruction Bulletin (Upgrade - CENELEC Digital Electronics)
	1U03066G07	EExd Barrier Gland Kit (one pair of glands per kit)

¹ V-Strut assembly includes contact and thermocouple assembly.

² Contact and thermocouple assembly includes platinum pad and inconel wire.

NOTE: The replacement parts listed above must be obtained only from the manufacturer or his agent.

APPENDIX BX, REV. 1.2
HPS 3000
HEATER POWER SUPPLY
FIELD MODULE (CENELEC
APPROVED VERSION)

Instruction Bulletin IB-106-300NX Series Rev. 1.2

ROSEMOUNT[®] ANALYTICAL

FISHER-ROSEMOUNT[™] Managing The Process Better.[™]

HIGHLIGHTS OF CHANGES

Effective February, 1995 Rev. 1.1

PAGE	SUMMARY
1-2	Figure 1-3. Updated for IB consistency.

Effective January, 1997 Rev. 1.2

PAGE	SUMMARY
1-1	Figure 1-2. Add fuse locations.
2-1	Insert protective cover and ground lead warning.
3-1	Insert protective cover and ground lead warning.
4-1	Table 4-1. Add expanded fuse specifications to replacement parts.

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SECTION I. DESCRIPTION

WARNING

Consult Safety Data Sheet 1M03243 for safety related information.

- 1-1. **DESCRIPTION.** The Rosemount CENELEC approved HPS 3000 Heater Power Supply Field Module (Figure 1-1) acts as an interface between probe and electronics and supplies power to the probe heater. The unit allows the use of probes with a number of different electronics packages.

The CENELEC approved HPS 3000 is certified EExd IIC T6 to CENELEC standards EN50014 and EN50018.

The heater power supply, Figure 1-2, consists of a motherboard, daughterboard, and a transformer for supplying correct voltage to the probe heater. The mother- and daughterboards contain terminal strips for connecting probe, electronics, and power supply.

The HPS is jumper configurable for 120, 220, or 240 Vac.

CAUTION

If you reconfigure the equipment for a line voltage other than the one marked on the serial label, then you should change the marking on the serial label to state the new line voltage.

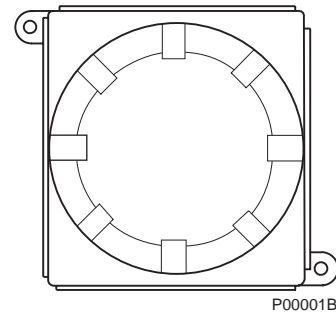


Figure 1-1. CENELEC Approved HPS 3000 Heater Power Supply Field Module

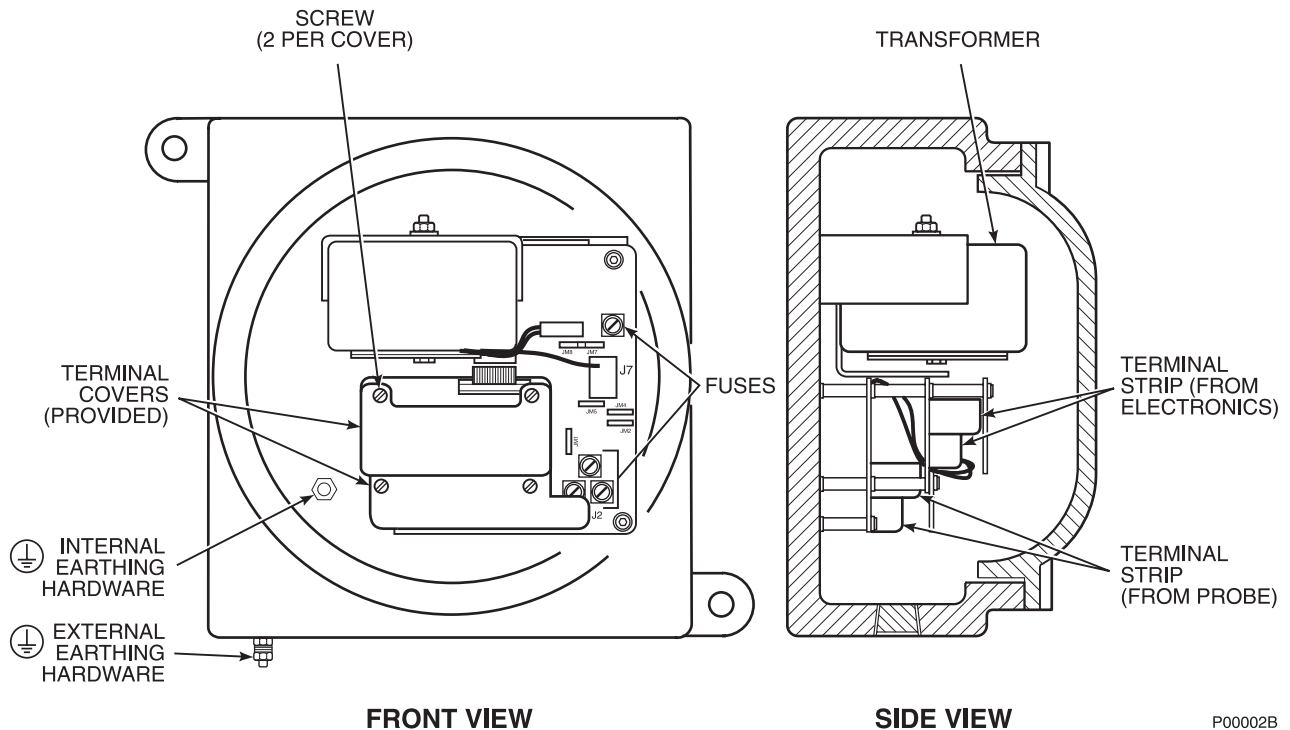


Figure 1-2. Heater Power Supply, Interior

Table 1-1. Specifications for Heater Power Supply.

Power Supply	110/115/220 VAC \pm 10% at 50/60 Hz
Power Requirement	200 VA
Humidity Range	95% Relative Humidity
Ambient Temperature Range	0° to 60°C (32° to 140°F)
Vibration	5 m/sec ² , 10 to 500 xyz plane
External Electrical Noise	Minimum Interference
Installation Category (Overvoltage Category)	IEC 664 Category II
Cabling Distance Between HPS 3000 and Probe	Maximum 45 m (150 ft)
Cabling Distance Between HPS 3000 and CRE 3000	Maximum 364 m (1200 ft)
Cabling Distance Between HPS 3000 and IFT 3000	Maximum 364 m (1200 ft)
Approximate Shipping Weight	20 kg (44 lbs)

1-2. THEORY OF OPERATION. The HPS 3000 Heater Power Supply may perform slightly different functions, depending upon which electronics package with which it is used. Figure 1-3 shows a functional block diagram of the unit. The HPS contains a transformer for converting line voltage to 44 volts needed to power the probe heater. The relay can be used to remotely turn the probe on or off manually. A triac module is used to turn the heater on or off, depending on probe temperature.

When used with the CRE 3000 Control Room Electronics or IFT 3000 Intelligent Field Transmitter, the HPS uses a cold junction temperature compensation feature. This allows for the use of a less expensive cable between the HPS and CRE or HPS and IFT. The HPS and electronics package can be located up to 364 m (1200 ft) apart.

The standard cable, between probe and HPS, is thermocouple compensated. This prevents the additional junctions between thermocouple and cable

from producing a voltage which would affect the thermocouple output signal. A temperature sensor in the HPS monitors the temperature at the junction and sends a voltage signal to the CRE and IFT. The CRE and IFT uses this signal to compensate the probe thermocouple reading for the temperature at the junction between the compensated and uncompensated cables.

In operation, when connected to the CRE 3000 Control Room Electronics, line voltage passes through the relay (when on) and is converted into 44 volts by the transformer. If the probe thermocouple indicates that the probe has dropped below operating temperature, a signal from the CRE triggers the triac. The triac then supplies voltage to the probe heater, warming the cell. Conversely, if the probe thermocouple indicates that the probe heater has reached the upper limit of operating temperature, the CRE deactivates the triac, shutting off power to the heater.

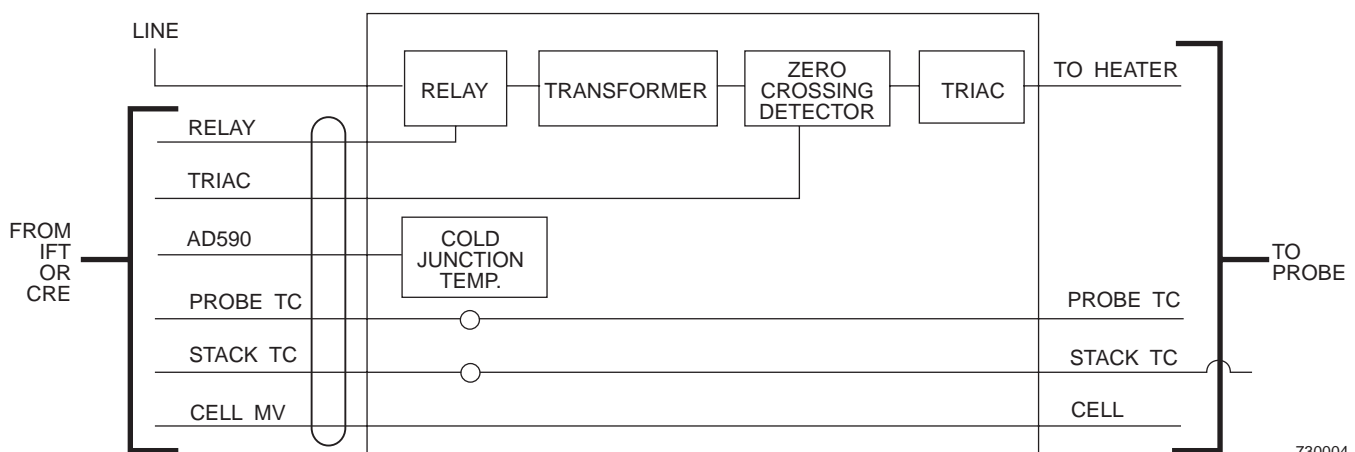


Figure 1-3. Heater Power Supply Block Diagram

1-3. CONNECTIONS TO NEW GENERATION ELECTRONICS (IFT 3000 AND CRE 3000).

Use the following information about input and output connections if your system includes CENELEC approved new generation electronics.

- a. **Probe Thermocouple.** PBTC+ and PBTC- (J3 pins 4 and 5, J8 pins 3 and 4). This thermocouple provides feedback from the probe heater to the electronics.
- b. **Stack Thermocouple.** (Optional) STTC+ and STTC- (J2 pins 1 and 2, J9 pins 5 and 6). The stack thermocouple is a thermocouple separate from the CENELEC approved World Class 3000 Probe. It is used to measure stack temperature.
- c. **AD590.** AD590+ and AD590- (J8 pin 5, J8 pin 6). The AD590 is a temperature measuring device used to measure temperature inside the CENELEC approved Heater Power Supply HPS 3000.
- d. **Zirconium Cell.** PBMV+ and PBMV- (J3 pins 1 and 2, J8 pins 1 and 2). The voltage signal from the zirconium cell.
- e. **Probe Heater.** 44 Vac output (J2 pins 4, 5, and 6). The 44 Vac output to power the probe heater.
- f. **TRIAC.** TRIAC+ and TRIAC- (J9 pins 1 and 2). The signal by which the new generation electronics controls the triac of Heater Power Supply HPS 3000. By controlling this triac, the new generation electronics modulates the 44 V waveform to the probe heater.
- g. **Relay.** Relay+ and Relay- (J9 pins 3 and 4). By activating or deactivating this relay, the new generation electronics can switch off or switch on the 44 Vac from the Heater Power Supply HPS 3000 to the probe heater. This feature is jumper selectable (JM2).
- h. **Line Voltage.** (J1 pins 1, 2, and 3). Jumper selectable (JM1, JM4, and JM5) for 120 Vac or 220/240 Vac.
- i. **Shield (Cable Armour).** The cable armour, as well as providing mechanical protection, acts as a shield. This shield is directly connected to the Heater Power Supply HPS 3000 housing through the cable gland.

NOTE

When using the HPS 3000 with an existing electronics package, such as Models 218, 218A, or 225, the electronics will not have the input/output capacity to support all of the functions mentioned in this section. Refer to Instruction Bulletin IB-106-300NEX.

1-4. CONNECTION TO OLD GENERATION ELECTRONICS.

Use the following information about input and output connections if your system does not include CENELEC approved new generation digital electronics:

- a. **Probe Thermocouple.** PBTC+ and PBTC- (J3 pins 4 and 5, J8 pins 3 and 4). This thermocouple provides feedback from the probe heater to the electronics.
- b. **Stack Thermocouple.** (Optional) STTC+ and STTC- (J2 pins 1 and 2, J9 pins 5 and 6). The stack thermocouple is a thermocouple separate from the WC3000 probe. It is used to measure stack temperature.
- c. **Zirconium Cell.** PBMV+ and PBMV- (J3 pins 1 and 2, J8 pins 1 and 2). The voltage signal from the zirconium cell.
- d. **Probe Heater.** 44 Vac out (J2 pins 4, 5, and 6). This is the 44 Vac output to power the probe heater.
- e. **Line Voltage Pins.** This is a modulated 115 Vac from the old generation electronics. Bridge rectifier (BR1) converts this modulated 115 Vac to the TRIAC+ and TRIAC- low voltage signal. This signal controls the triac of the Heater Power Supply HPS 3000. A modulated 44 Vac is thus sent to the probe heater.
- f. **Shield.** (Optional.) (J8 pin 7.) The PBMV+/PBMV- and the PBTC+/PBTC- lines to the old generation electronics may be shielded against electrical noise through these connections.
- g. **Shield (Cable Armour).** The cable armour, as well as providing mechanical protection, acts as a shield. This shield is directly connected to the Heater Power Supply HPS 3000 housing through the cable gland.

SECTION II. HPS 3000 TROUBLESHOOTING

WARNING

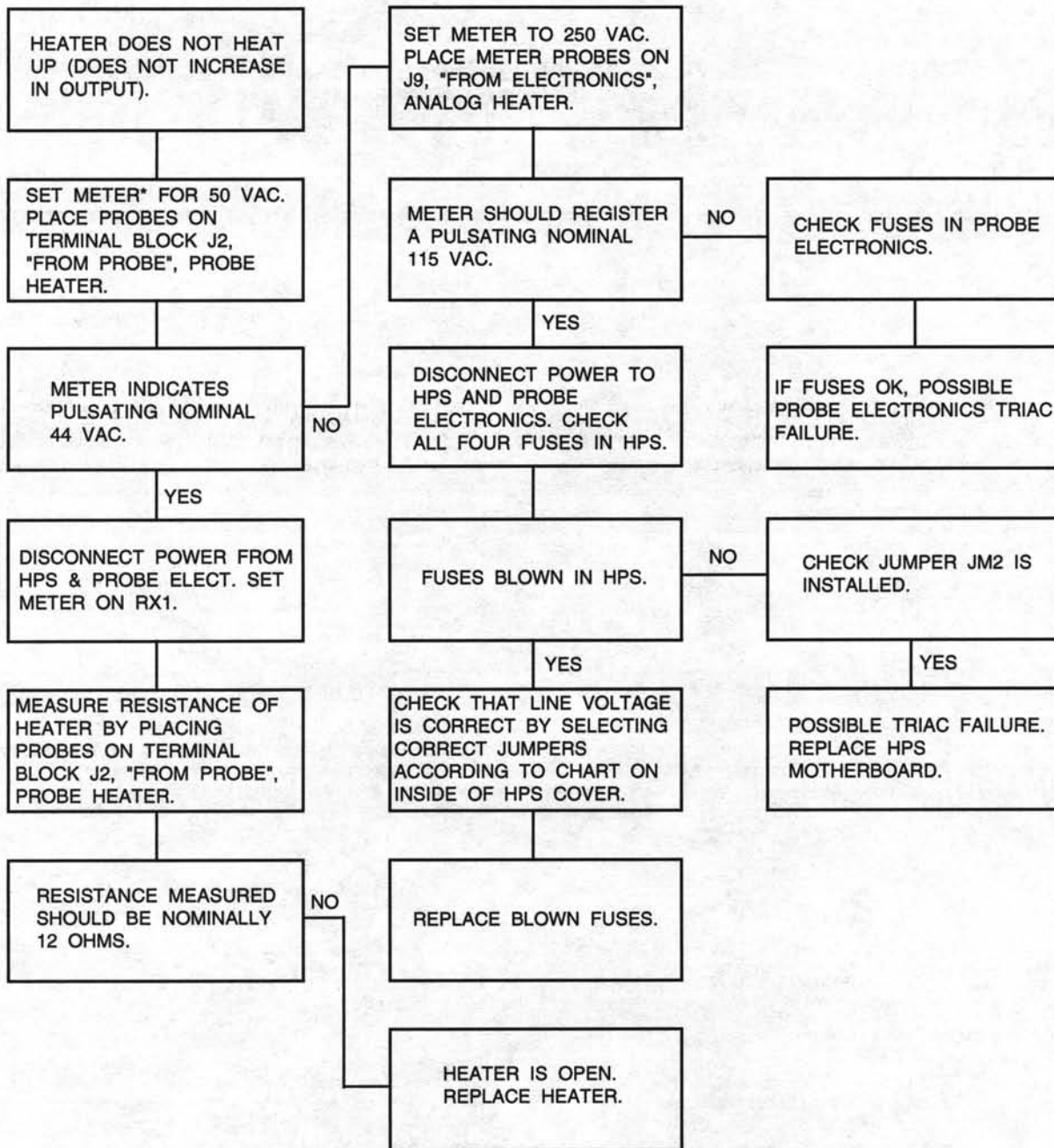
Before carrying out any work on the CENELEC approved HPS 3000, consult Safety Data Sheet 1M03243.

WARNING

Install all protective equipment covers and safety ground leads after troubleshooting. Failure to replace covers and ground leads could result in serious injury or death.

- 2-1. **OVERVIEW.** The HPS 3000 troubleshooting section describes how to identify and isolate faults which may develop in the HPS 3000 assembly.
- 2-2. **HPS 3000 TROUBLESHOOTING.** The HPS 3000 troubleshooting may overlap with the probe in use in the system. Faults in either system may cause an error to be displayed in the electronics package. Figures 2-1 and 2-2 provide troubleshooting information.

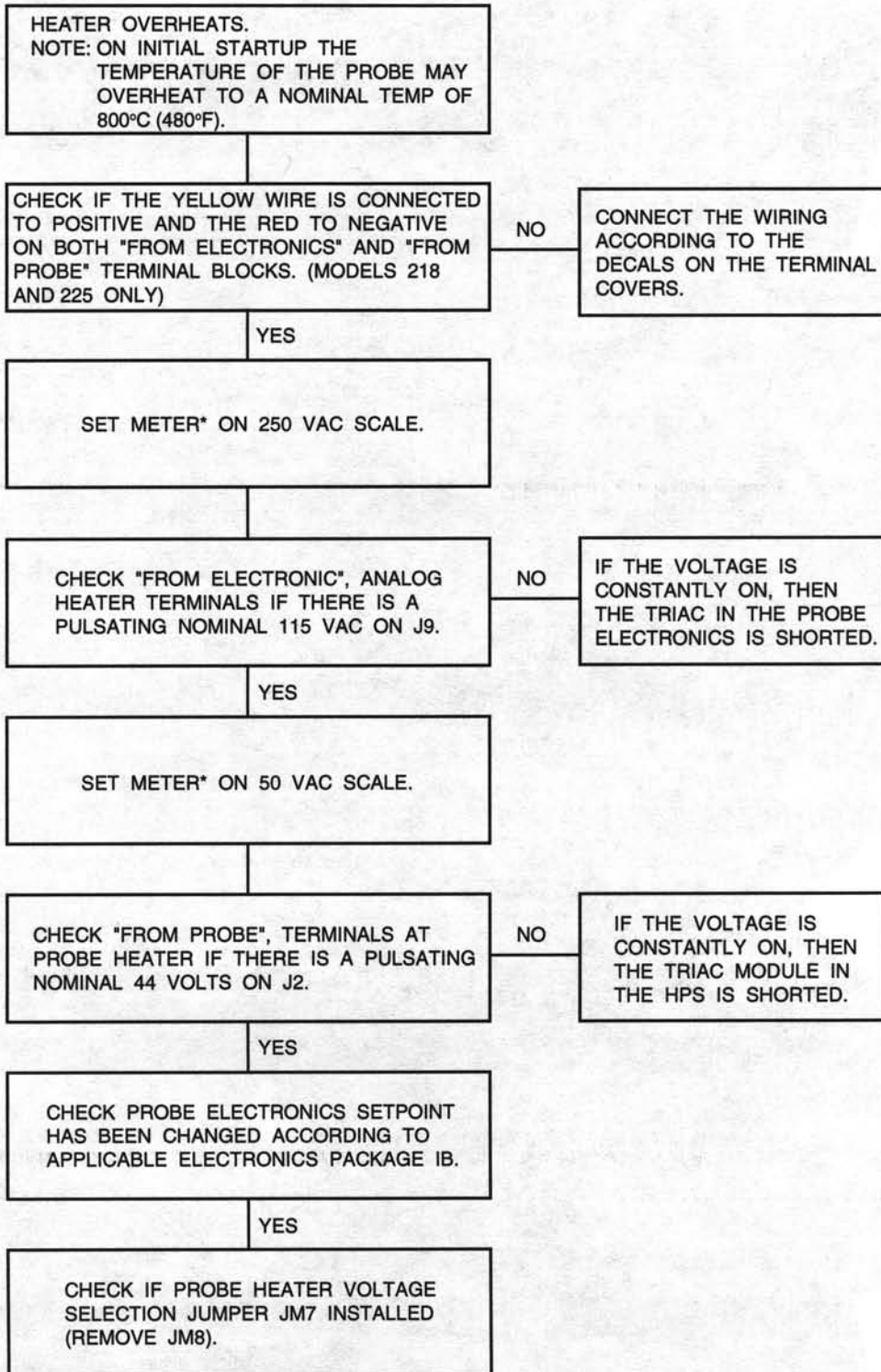
SYMPTOM



*SIMPSON MODEL 260 OR EQUIVALENT MULTIMETER.

Figure 2-1. HPS Troubleshooting Flowchart, #1

SYMPTOM



*SIMPSON MODEL 260 OR EQUIVALENT MULTIMETER.

Figure 2-2. HPS Troubleshooting Flowchart, #2

SECTION III. SERVICE AND NORMAL MAINTENANCE

WARNING

Consult Safety Data Sheet 1M03243 before performing any work on the CENELEC approved HPS 3000.

WARNING

Install all protective equipment covers and safety ground leads after equipment repair or service. Failure to install covers and ground leads could result in serious injury or death.

3-1. OVERVIEW. This section describes service and routine maintenance of the HPS 3000 Heater Power Supply Field Module. Replacement parts referred to are available from Rosemount. Refer to Section IV of this appendix for part numbers and ordering information.

3-2. FUSE REPLACEMENT. The heater power supply's motherboard (25, Figure 3-1) contains four identical 5 amp fuses (24) (5 amp anti-surge, Type T to IEC127, ROSEMOUNT Part No. IL01293H02). To check or replace a fuse, simply unscrew the fuse holder cap (23) with a flat head screwdriver and remove fuse. After checking or replacing a fuse, reinstall fuse holder cap.

3-3. TRANSFORMER REPLACEMENT.

WARNING

Consult Safety Data Sheet 1M03243 before performing any work on the CENELEC approved HPS 3000.

- a. Follow the power down procedure outlined in safety data sheet 1M03243 and the official "Codes of Practice" for your country of installation.
- b. Loosen setscrew (13, Figure 3-1) retaining HPS cover (14). Remove HPS cover.
- c. Remove hex nut (2), flat washer (3), and hex head bolt (4) that retain transformer to mounting bracket.

- d. Disconnect the 6-pin transformer wiring harness connector from J7 on the HPS motherboard (25). Disconnect the 2-pin wiring harness connector from the jumper that was selected to configure the HPS for the proper voltage.

NOTE

The transformer connector is keyed making connection possible in only one direction.

- e. Remove old toroidal transformer (11). Place new transformer in position and reconnect wiring harness connectors as noted in step d.
- f. Place insulating disc (10) (one on either side of transformer) and metal disc (12) on transformer.
- g. Tighten hex nut (2) and hex head bolt (4) only enough to firmly hold transformer in place.
- h. Reinstall HPS cover (14) and secure with setscrew (13).

3-4. MOTHERBOARD REPLACEMENT.

WARNING

Consult Safety Data Sheet 1M03243 before performing any work on the CENELEC approved HPS 3000.

- a. Follow the power down procedure outlined in safety data sheet 1M03243 and the official "Codes of Practice" for your country of installation.
- b. Loosen setscrew (13) retaining HPS cover (14). Remove cover.
- c. Disconnect transformer wiring harness connectors as described in the previous paragraph from motherboard (25).
- d. Remove slotted screw (16), lockwasher (17), and flat washer (18) attaching terminal strip covers (19) and (20). Remove terminal strip covers.

NOTE: NOT ALL PARTS SHOWN ARE AVAILABLE FOR PURCHASE SEPARATELY. FOR A LIST OF AVAILABLE PARTS, SEE TABLE 4-1.

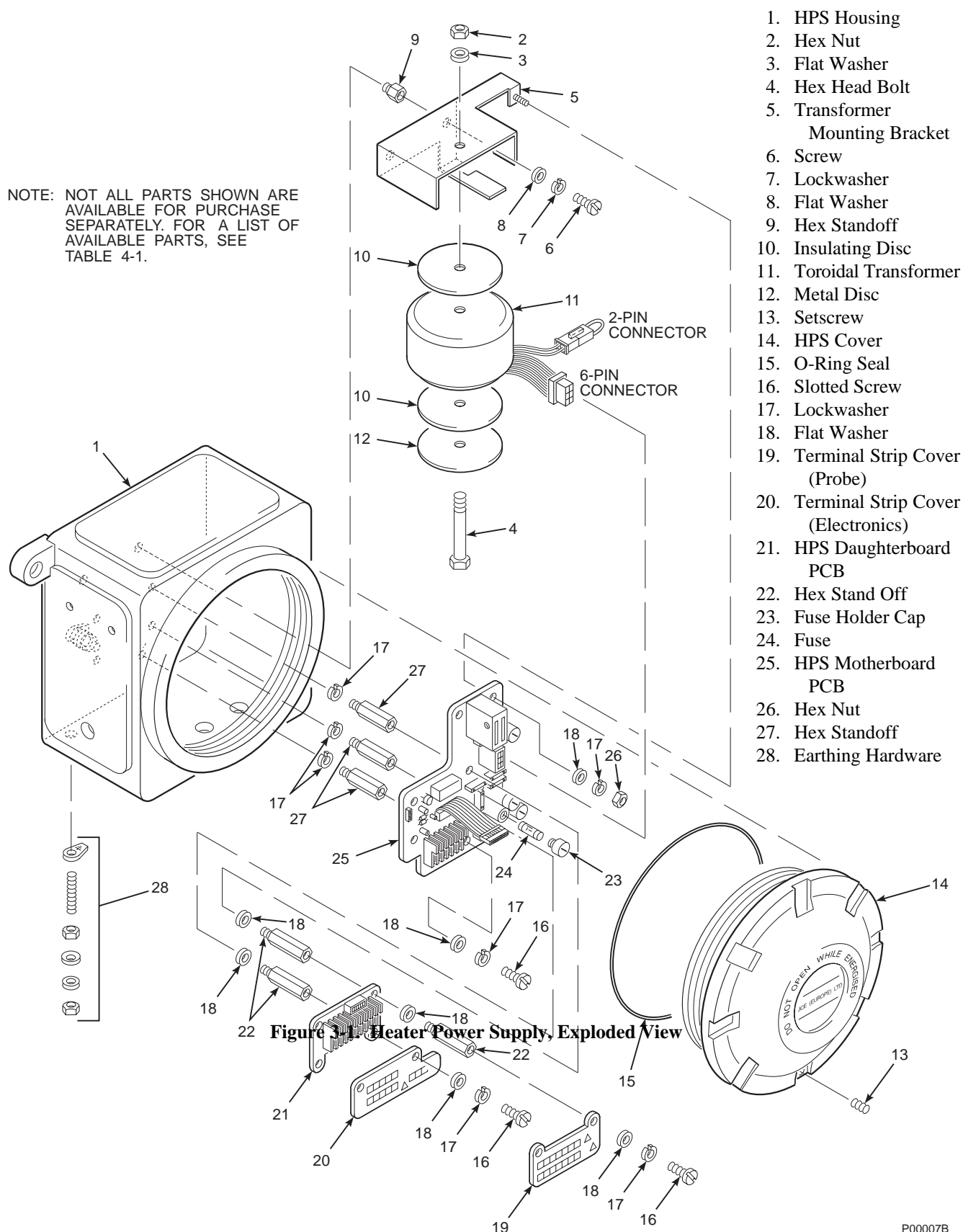


Figure 3-4. Heater Power Supply, Exploded View

P00007B

- e. Unplug ribbon cable from the receptacle on the daughterboard (21). Take note of location of black and white wires connected to pin 8 and pin 9 of terminal strip J8. Disconnect these wires from J8.
- f. Unscrew stand offs (22) on either side of the daughterboard. Remove daughterboard (21).
- g. Unscrew four stand offs (22) that support the daughterboard.
- h. Making a note of the location and color of each wire, disconnect wires from terminal strip on HPS motherboard (25).
- i. Remove hex nut (26), lockwasher (17), and flat washer (18) securing the HPS motherboard to the enclosure and transformer mounting bracket (5).
- j. Remove motherboard (25).
- k. Position new motherboard on stand offs and reinstall hex nut, lockwasher, and flat washer removed in step i.
- l. Reconnect wires to terminal strip in positions noted in step h. Cross check with wiring diagram shown on Figure 2-4 of the main text (IB-106-300NX Series).
- m. Reinstall four stand offs removed in step g. Position daughterboard (21) on stand offs and reinstall stand offs removed in step f.
- n. Plug ribbon cable back into receptacle on daughterboard and reconnect black and white wires. The black wire goes to pin 8 and the white to pin 9 of terminal block J8 on daughter board. Reinstall terminal covers.
- o. Reconnect transformer wiring harness connectors to motherboard. Note that in any case, the transformer's connector is keyed so that it can only be inserted one way.
- p. Reinstall HPS cover (14) and secure with setscrew (12).

3-5. DAUGHTERBOARD REPLACEMENT.

WARNING

Consult Safety Data Sheet 1M03243 before performing any work on the CENELEC approved HPS 3000.

- a. Follow the power down procedure outlined in safety data sheet 1M03243 and the official "Codes of Practice" for your country of installation.
- b. Loosen setscrew (13, Figure 3-1) retaining HPS cover (14). Remove cover.
- c. Remove slotted screw (16), lockwasher (17), and flat washer (18) securing terminal strip covers (19) and (20). Remove terminal strip covers.
- d. Making a note of the location and color of each wire, disconnect wires from the terminal strip on the daughterboard (21).
- e. Unplug ribbon cable from receptacle on daughterboard. Take note of location of black and white wires connected to pin 8 and pin 9 of terminal strip J8. Disconnect these wires from J8.
- f. Unscrew two stand offs (22) from daughterboard. Remove daughterboard (21).
- g. Position new daughterboard on four stand offs (22) on motherboard (25). Reinstall the stand offs removed in step f.
- h. Plug ribbon cable back into receptacle on daughterboard and reconnect black and white wires. The black wire goes to pin 8 and the white wire to pin 9 of terminal block J8 on daughterboard. Reinstall terminal covers.
- i. Reconnect wires to terminal strip in positions noted in step d. Cross check with wiring diagram shown on Figure 2-4 of the main text (IB-106-300NX Series). Reinstall terminal covers.
- j. Reinstall HPS cover (14) and secure with setscrew (13).

SECTION IV. REPLACEMENT PARTS

Table 4-1. Replacement Parts for Heater Power Supply.

FIGURE and INDEX No.	PART NUMBER	DESCRIPTION
1-1	1U05667G01	CENELEC HPS 3000 (120V)
1-1	1U05667G03	CENELEC HPS 3000 (220V/240V)
3-1, 24	1L01293H02	Fuse 5A @ 250 Vac, anti-surge, case size; 5 x 20 mm, type T to IEC127, Schurter
3-1, 25	3D39080G02	Motherboard
3-1, 21	3D39078G01	Daughterboard
3-1, 11	1M02961G05	Toroidal Transformer (120V/240V)
	IB-106-300NEX	Instruction Bulletin Upgrade and Digital Electronics
	IB-106-300NFX	Instruction Bulletin (IFT)
	IB-106-300NCX	Instruction Bulletin (CRE)

NOTE: The replacement parts listed above must be obtained only from the manufacturer or his agent.

APPENDIX DX, REV. 2.1
MPS 3000
MULTIPROBE TEST GAS
SEQUENCER

Instruction Bulletin IB-106-300NX Series Rev. 2.1

WARNING

The MPS 3000 Multiprobe Test Gas Sequencer must be installed in a non-hazardous, explosive free environment.

NOTE

Z-Purge option is available. Reference page 1-4.

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HIGHLIGHTS OF CHANGES

Effective February, 1995 Rev. 2

PAGE	SUMMARY
--	General. Updated appendix with new version of MPS.

Effective January, 1997 Rev. 2.1

PAGE	SUMMARY
2-1	Insert protective covers and ground warning.
3-1	Insert protective covers and ground warning. Add fuse specifications and clarify fuse replacement.
4-1	Add fuse specifications to replacement parts.

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SECTION I. DESCRIPTION

WARNING

The MPS 3000 must be installed in a non-hazardous, explosive-safe environment.

NOTE

Z-Purge option is available. Reference page 1-4.

- 1-1. **DESCRIPTION.** The Rosemount MPS 3000 Multiprobe Test Gas Sequencer provides automatic test gas sequencing for up to four probes. The MPS routes test gas to the selected probe under control of the CRE, IFT, or digital electronics package. The electronics package can be preprogrammed by the user for automatic periodic recalibration, or manually initiated calibration through the keypad on the front of the electronics package. The calibration parameters held in the electronics package can be selected to automatically update after each calibration.

The MPS is housed in a NEMA 4X (IP56) non-hazardous enclosure, Figure 1-1.

NOTE

A single multichannel MPS cannot be shared among a number of CRE electronics.

The MPS, Figure 1-2, consists of: an air pressure regulator, a terminal board, a flowmeter assembly (one for each probe, up to four per MPS), HI GAS solenoid, LO GAS solenoid, a manifold, and a power supply. Each flowmeter assembly contains a probe solenoid.

An optional Z-purge arrangement is available for hazardous area classification. See Application Data Bulletin AD 106-300B.

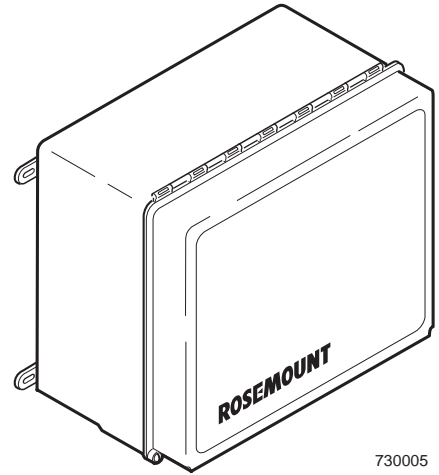


Figure 1-1. MPS 3000 Multiprobe Test Gas Sequencer

- 1-2. **THEORY OF OPERATION.** A typical automatic calibration setup is shown in Figure 1-3. The MPS 3000 Multiprobe Test Gas Sequencer operates under the control of the CRE, IFT, or digital electronics package. When the electronics package initializes automatic calibration, the solenoid controlling the selected probe is energized. Next, the solenoid controlling test gas 1 (high O₂) energizes allowing test gas 1 to flow to that probe. After the probe measures the oxygen concentration of test gas 1, the gas solenoid is deenergized. An operator selected time delay allows the gas to clear the system. Next, the solenoid controlling test gas 2 (low O₂) energizes and allows test gas 2 to flow to the probe. After the probe measures the oxygen concentration of test gas 2, the gas and probe solenoids deenergize. The automatic calibration is now complete for the probe selected.

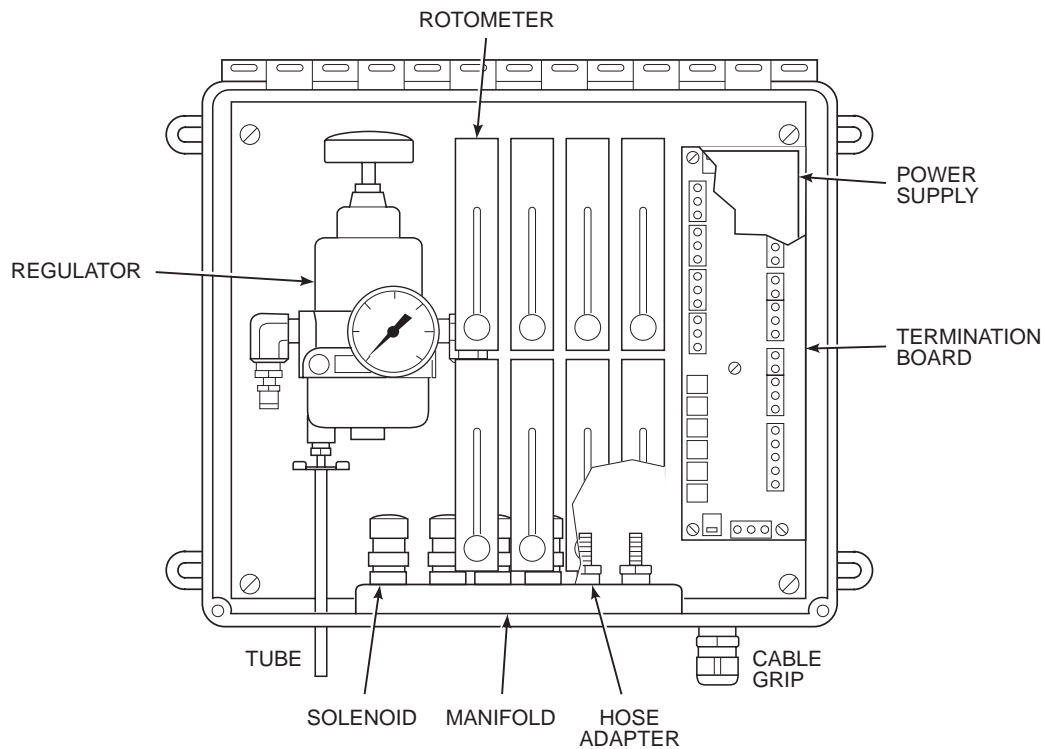


Figure 1-2. Multiprobe Test Gas Sequencer, Interior

Table 1-1. Specifications for Multiprobe Test Gas Sequencer.

Power Supply	110/115/220 Vac ±10% at 50/60 Hz
Power Requirement	15 VA (Watts)
Electrical Classification	NEMA 4X (IP56)
Humidity Range	95% Relative Humidity
Ambient Temperature Range	-30° to 71 °C (-20° to 160 °F)
Vibration	5 m/sec², 10 to 500 xyz plane
External Electrical Noise	Minimum Interference
Installation Category (Overvoltage Category)	IEC 664 Category II
Piping Distance Between MPS 3000 and Probe	Maximum 91 m (300 ft)
Cabling Distance Between MPS 3000 and Electronics Package .	Maximum 303 m (1000 ft)
In Calibration Status Relay	48V max, 100 mA max
Cabling Distance Between MPS 3000 and Status Relay Indicator	Maximum 303 m (1000 ft)
Approximate Shipping Weight	16 kg (35 lbs)

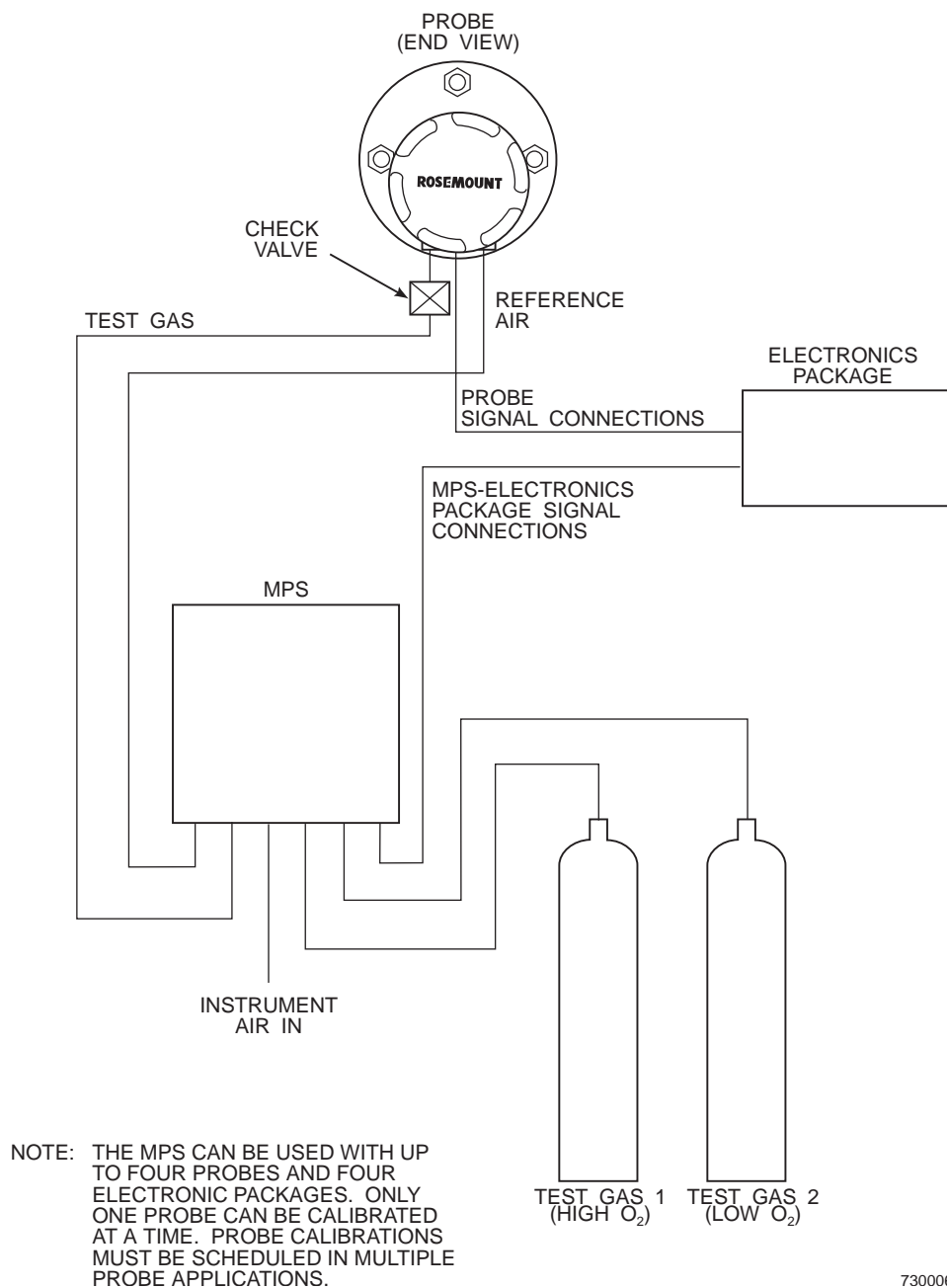


Figure 1-3. Typical Automatic Calibration System

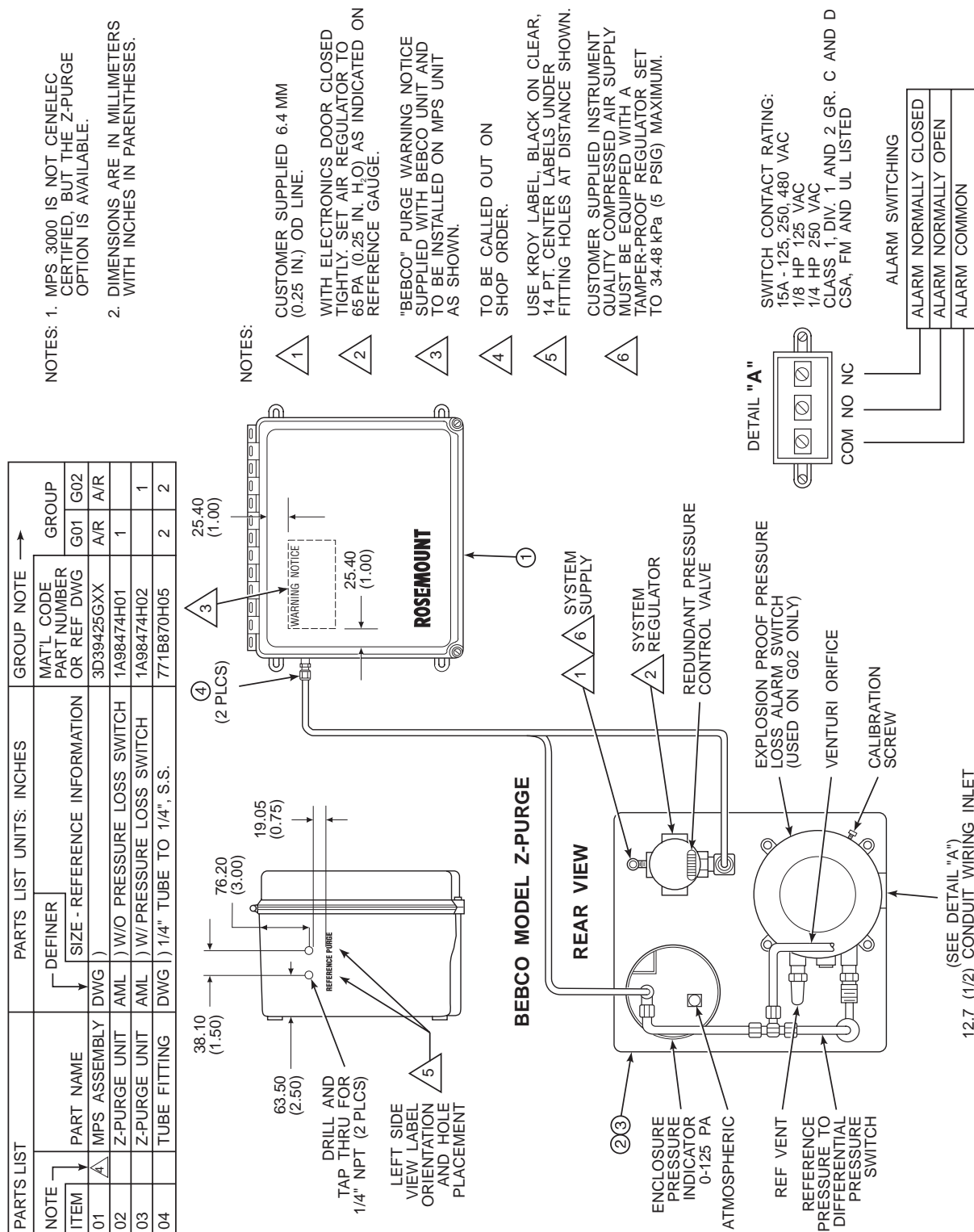


Figure 1-4. MPS with Z-Purge

SECTION II. MPS 3000 TROUBLESHOOTING

2-1. OVERVIEW. This section describes troubleshooting for the Multiprobe Test Gas Sequencer. Additional troubleshooting information can be found in the Instruction Bulletin for the electronics package.

2-2. TROUBLESHOOTING. Table 2-1 provides a guide to fault finding failures within the MPS. The flowchart in Figure 2-1 provides an alternate approach to fault finding MPS related problems.

WARNING

Install all protective equipment covers and safety ground leads after troubleshooting. Failure to replace covers and ground leads could result in serious injury or death.

Table 2-1. Fault Finding.

SYMPTOM	CHECK	FAULT	REMEDY
1. Power to solenoid, test gas not released to probe.	Test gas	Insufficient test gas	Install new test gas tanks.
	Solenoid	Solenoid failure	Replace solenoid.
2. No power to solenoid.	Power supply output	Power supply failure	Replace power supply.
	Fuses in power supply	Fuse blown	Replace fuse.
	Main power source	Main power off	Reestablish power.

SYMPTOM

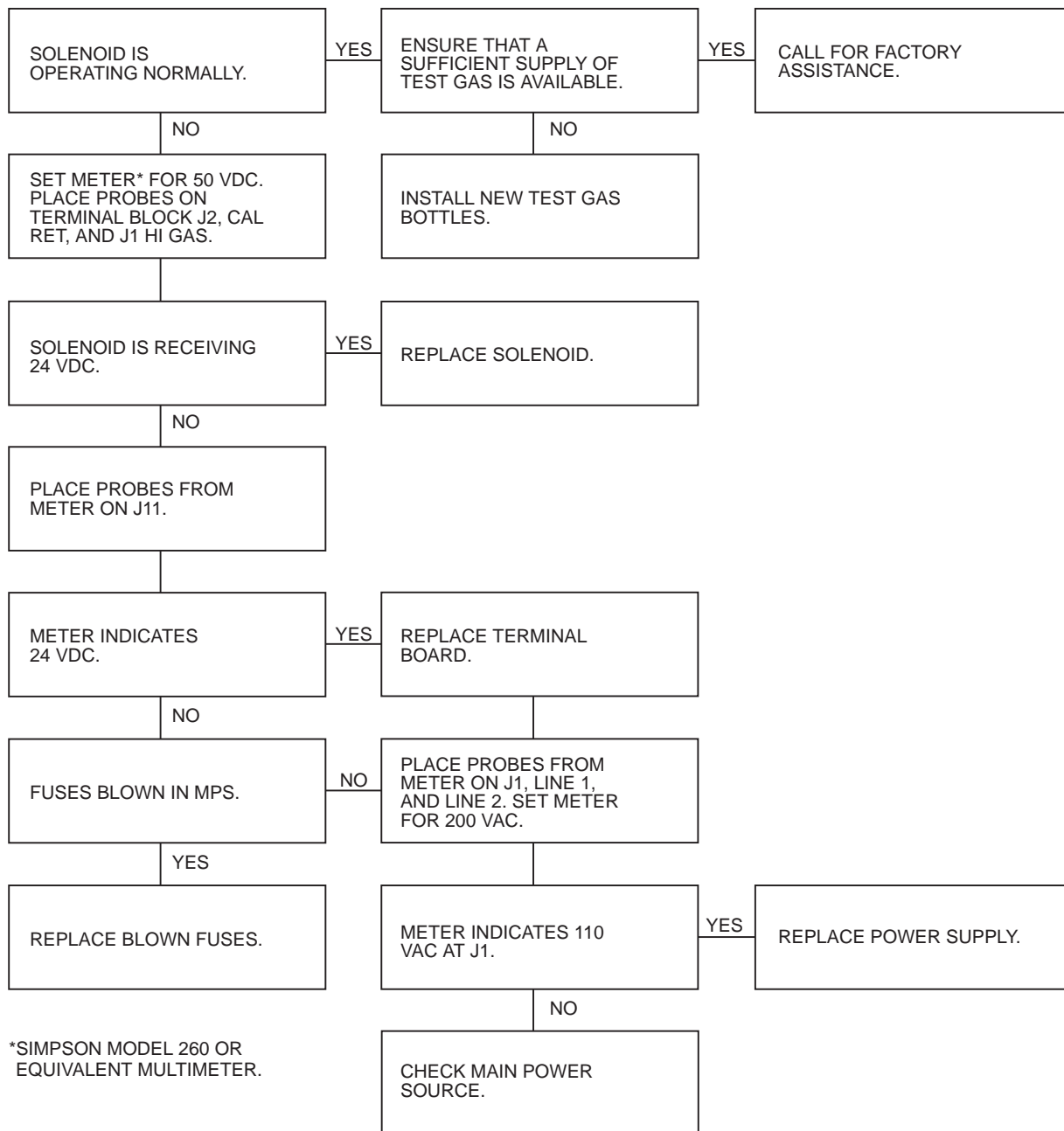


Figure 2-1. MPS Troubleshooting Flowchart

SECTION III. SERVICE AND NORMAL MAINTENANCE

- 3-1. OVERVIEW.** This section describes service and routine maintenance of the MPS 3000 Multiprobe Test Gas Sequencer. Replacement parts referred to are available from Rosemount. Refer to Table 4-1 for part numbers and ordering information.

WARNING

Install all protective equipment covers and safety ground leads after equipment repair or service. Failure to install covers and ground leads could result in serious injury or death.

- 3-2. FUSE REPLACEMENT.** Power supply (58, Figure 3-1) contains two identical fuses. Perform the following procedure to check or replace a fuse.

WARNING

Disconnect and lock out power before working on any electrical components.

NOTE

220 Vac versions use two 0.5 amp quick acting fuses (P/N 138799-014). 115 Vac versions use two 1 amp quick acting fuses (P/N 138799-004). Refer to Table 4-1 for additional fuse specifications.

- a. Turn off power to the system.
- b. Open fuseholder (40) and remove the fuse. After checking or replacing a fuse, reinstall top of fuseholder (40).

- 3-3. POWER SUPPLY REPLACEMENT.**

WARNING

Disconnect and lock out power before working on any electrical components.

- a. Turn off power to the system.
- b. Loosen two captive screws holding the MPS cover (15, Figure 3-1). Open the MPS cover.
- c. Loosen two captive screws holding the inner cover (16). Lower the inner cover.
- d. Disconnect the 24V connector from J11 on the termination board (34).
- e. Remove two screws (39) and washers (38) holding the terminal cover (37). Remove the terminal cover.
- f. Tag and remove wires from terminals 1 and 4 or 5 of the transformer in the power supply (58).
- g. Remove two nuts (60) and washers (59) from the screws holding the power supply (58). Remove the power supply.
- h. Mount the new power supply onto the screws with two nuts (60) and washers (59). Make sure the ground wires are connected to the upper mounting screw.
- i. Reconnect the wires removed in step f.
- j. Install the terminal cover (37) with two screws (38) and washers (39).
- k. Connect the 24V connector to J11 on the termination board (34).
- l. Close and secure the inner cover (16) with two captive screws. Close and secure the outer cover (15) with two captive screws.

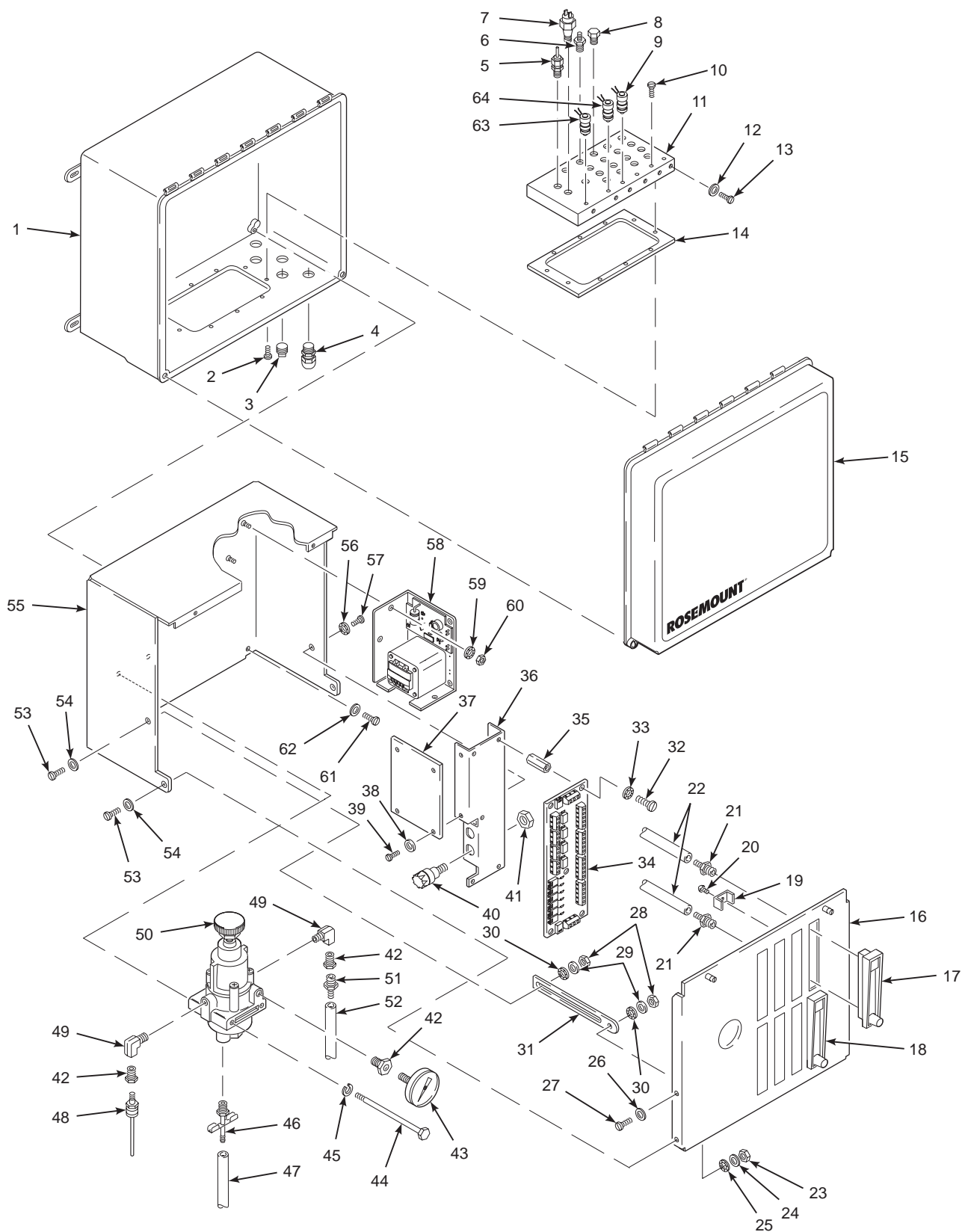


Figure 3-1. Multiprobe Test Gas Sequencer, Exploded View

LEGEND FOR FIGURE 3-1

ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Enclosure	23	Nut	45	Washer
2	Screw	24	Lockwasher	46	Drain Valve
3	Plug	25	Washer	47	1/8 in. Impolene Tubing
4	Cable Grip	26	Washer	48	Connector
5	Fitting	27	Screw	49	Elbow
6	Hose Adapter	28	Nut	50	Pressure Regulator
7	Pressure Switch	29	Washer	51	Hose Adapter
8	Plug	30	Washer	52	1/4 in. Tube
9	Solenoid Valve	31	Cover Stop Slide	53	Screw
10	Screw	32	Screw	54	Washer
11	Manifold	33	Washer	55	Inner Enclosure
12	Washer	34	Termination Board	56	Washer
13	Screw	35	Standoff	57	Screw
14	Gasket	36	Mounting Bracket	58	Power Supply
15	Outer Cover	37	Cover Plate	59	Washer
16	Inner Cover	38	Washer	60	Nut
17	Rotometer, 10 SCFH	39	Screw	61	Screw
18	Rotometer, 2.0 SCFH	40	Fuseholder	62	Washer
19	Bracket	41	Plastic Nut	63	Solenoid
20	Screw	42	Bushing	64	Solenoid
21	Hose Adapter	43	Pressure Gauge		
22	1/8 in. Hose	44	Bolt		

- 3-4. SOLENOID VALVE REPLACEMENT.** An MPS 3000 will always have a HI GAS solenoid (63, Figure 3-1) and a LOW GAS solenoid (64) mounted to the manifold (11). Each probe will also have a solenoid valve (9) mounted on the manifold.

WARNING

Disconnect and lock out power before working on any electrical components.

- a. Turn off power to the system.
- b. Loosen two captive screws holding the MPS cover (15, Figure 3-1). Open the MPS cover.
- c. Loosen two captive screws holding the inner cover (16). Lower the inner cover.
- d. Disconnect the HI GAS (J17), LOW GAS (J18), or Probe (J13-J16) plug from its receptacle on the termination board (34).
- e. Loosen the retaining ring in the middle of the solenoid and remove the top part.
- f. With a spanner wrench or padded pliers, remove the remaining part of the solenoid from the manifold (11).
- g. Separate the new solenoid and screw the smaller part into the manifold.
- h. Place the top part of the solenoid into position and tighten the retaining ring.
- i. Connect the plug to the proper receptacle on the termination board (34).
- j. Close and secure the inner cover (16) with two captive screws. Close and secure the outer cover (15) with two captive screws.

3-5. PRESSURE REGULATOR MAINTENANCE.

- a. **Pressure Adjustments.** Pressure regulator (50, Figure 3-1) is factory set to 138 kPa (20 psi). Should the pressure need to be changed or adjusted, use the knob on top of the pressure regulator.
- b. **Condensation Drain.** To drain excess moisture from the internal gas circuit of the MPS, periodically loosen drain valve (46) on the bottom of pressure regulator (50). The moisture will flow through vinyl tubing drain (47) on the bottom of pressure regulator (50) and exit the bottom of MPS enclosure (1).

- 3-6. **FLOWMETER ADJUSTMENTS.** There are two flowmeters per flowmeter assembly. The top flowmeter is factory set to 5 scfh. The bottom flowmeter is set to 2 scfh. Should the flow need to be changed or adjusted, use knob on the bottom of the respective flowmeter.

- 3-7. **ADDING PROBES TO THE MPS.** This procedure is used to add a probe to the MPS.

WARNING

Disconnect and lock out power before working on any electrical components.

- a. Turn off power to the system.
- b. Loosen the two captive screws holding the MPS cover (15). Lift the cover.

- c. Loosen the two captive screws that hold the inner cover (16) and lower the cover.
- d. From the backside of the inner cover, locate the rotameter positions next to the existing unit(s). Insert a hacksaw blade into the slots surrounding the positions for two rotameters, and saw out the knockout tabs.
- e. From the front of the inner cover, install a rotameter (P/N 771B635H01) into the top hole and a rotameter (P/N 771B635H02) into the bottom hole. From the backside secure with brackets provided.
- f. Remove four brass screw plugs (TEST GAS IN, TEST GAS OUT, REF GAS IN, and REF GAS OUT) for the next probe position in the manifold.
- g. Install 1/8" hose adapters (P/N 1A97553H01) into the empty holes using a suitable pipe dope. Attach the tubing.
- h. Remove a brass screw plug (P/N 1A97900H01) and install a solenoid (P/N 3D39435G01). Make sure the O-ring seals properly.
- i. Attach the hoses to the rotameter using the existing installation as a guide. Support the rotameter while attaching the hose.
- j. Install the solenoid wire connector into the proper position (J14-J16) on the termination board (34).
- k. Close and secure the inner cover (16) with two captive screws. Close and secure the outer cover (15) with two captive screws.

SECTION IV. REPLACEMENT PARTS

Table 4-1. Replacement Parts for the Multiprobe Test Gas Sequencer.

FIGURE and INDEX No.	PART NUMBER	DESCRIPTION
3-1, 1	1A97909H01*	Power Supply
3-1, 9	3D39435G01**	Solenoid Valve
3-1, 40	138799-004	Fuse, fast acting, 1A @ 250 Vac, size: 1/4" Dia. x 1-1/4" Lg., glass body, non time delay, Bussman part no. BK/AGC-1
3-1, 40	138799-014	Fuse, fast acting, 0.5A @ 250 Vac, size: 1/4" Dia. x 1-1/4" Lg., glass body, non time delay, Bussman part no. BK/AGC-1/2
3-1, 7	771B635H01**	Flowmeter Assembly - Test Gas
3-1, 7	771B635H02**	Flowmeter Assembly - Reference Gas
	1A98631	Probe Adder Kit
3-1, 17	1A97553H01**	Hose Adapter
	4947B46H01**	Tubing Length
	4847B46H02**	Tubing Length
	4847B46H03**	Tubing Length
	4847B46H04**	Tubing Length
1-3	7307A56602	Check Valve

* Specify line voltage and probe type when ordering.

** These items are included in the probe adder kit.

APPENDIX EX, REV. 1.3

IFT 3000

INTELLIGENT FIELD

TRANSMITTER

Instruction Bulletin IB-106-300NX Series Rev. 1.3

ROSEMOUNT[®] ANALYTICAL

FISHER-ROSEMOUNT™ Managing The Process Better.™

HIGHLIGHTS OF CHANGES

Effective February, 1995 Rev. 1.1

PAGE	SUMMARY
1-3	Figure 1-2. Updated for IB consistency.
2-3	Figure 2-2. Updated Flowchart.

Effective May, 1995 Rev. 1.2

PAGE	SUMMARY
1-3/1-4	Figure 1-2. Added callout text "Heater Power Supply (Optional)".

Effective January, 1997 Rev. 1.3

PAGE	SUMMARY
2-1	Insert protective covers and safety ground warning.
3-1	Insert protective covers and safety ground warning.
4-1	Add expanded fuse specifications to replacement parts.

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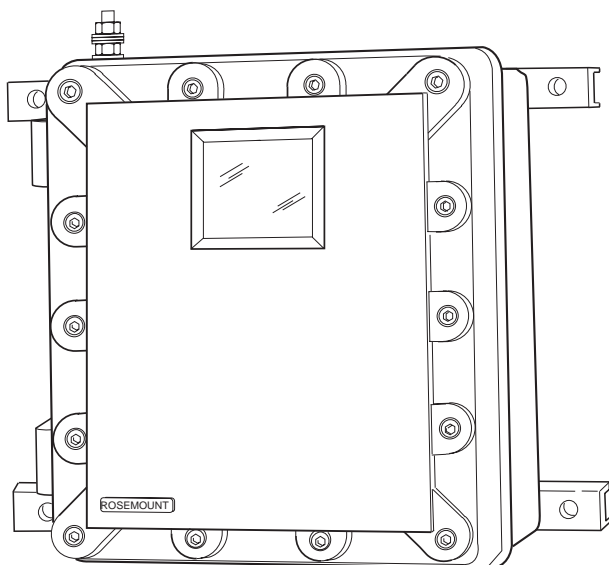
SECTION I. DESCRIPTION

WARNING

See Safety Data Sheet 1M03296 for safety related information.

- 1-1. DESCRIPTION.** The Rosemount IFT 3000 Intelligent Field Transmitter (IFT) (CENELEC Approved), Figure 1-1, provides all necessary intelligence for controlling a probe and the optional Multiprobe Test Gas Sequencer. The IFT provides a user-friendly, menu-driven operator interface with context-sensitive, on-line help. The IFT may also be used without an HPS.

The IFT is based on a modular design. There is a maximum total of five PC boards within the IFT. Every IFT contains a microprocessor board, a power supply board, and an interconnect board. Additionally, an IFT may also contain an LDP field electronics board and/or GUI (General User Interface) multipurpose board depending upon the configuration needed.



**Figure 1-1. IFT 3000 Intelligent Field Transmitter
(CENELEC Approved)**

The front panel configuration may be as follows: a blind unit with no display, a GUI interface with an LDP, and an LDP interface with four membrane keys. If the IFT has both a GUI interface and an LDP, the LDP will not be equipped with the operator keys.

- a. Microprocessor Board.** The microprocessor board contains, EEPROM, RAM, and a real-time clock. The microprocessor board also controls the probe heater. The IFT can be used in conjunction with or without an optional HPS 3000 Heater Power Supply providing power to the heater depending upon the user's application.
- b. Interconnect Board.** The interconnect board is used for all communications from the IFT to the other components within the system. These other components may include an optional HPS 3000 Heater Power Supply, optional MPS Multiprobe Test Gas Sequencer, World Class 3000 Probe (non-HPS equipped system), additional IFTs or CREs, printer, IBM PC, analog output, and relay outputs.
- c. Power Supply Board.** The power supply board is user configurable for five different line voltages to include 100, 120, 220, and 240 Vac.
- d. LDP Field Electronics Board (optional).** The LDP field electronics board, which is part of the LDP assembly, may be installed in two possible configurations. The first configuration consists of an LED display which displays the current O₂ value. The display also has indicating LEDs for high test gas (TGH), low test gas (TGL), and calibrating (CAL).

The second possible configuration consists of the LED display with four membrane keys. This configuration is used only when the IFT has not been equipped with a GUI multipurpose board. The four membrane keys only allow for calibration to be selected and test gas values to be changed.

Table 1-1. Specifications for Intelligent Field Transmitter.

Electrical Classification	EExd II BT6 (IP65)
Humidity Range	95% Relative Humidity
Ambient Temperature Range	0° to 50°C (32° to 122°F)
Vibration	5 m/sec ² , 10 to 500 xyz plane
External Electrical Noise	Minimum interference
*Communications	1 RS-422 for printer 1 RS-485 for field communications (CRE 3000 or IBM PC)
Analog Outputs	Isolated, 0-20 mA, 4-20 mA, 0-10 V, 20-0 mA, 20-4 mA, or 10-0 V output
O ₂ Accuracy (analog output)	0.1% O ₂ or ±3% of reading, whichever is greater using Hagan test gases
O ₂ Range	Field selectable
Power Supply	100/120/220/240 ±10% Vac at 50/60 Hz
Power Requirements	(w/HP S 3000): 30 VA (Watts) (w/WC 3000 Probe): 275 VA (Watts)
Installation Category (Overvoltage Category)	IEC 664 Category II
Output Resolution	11 bits (1 bit = 0.05% of output F.S.)
System Speed of Response (amplifier output)	Less than 3 seconds
Resolution Sensitivity - transmitted signal	10.01% O ₂
Deadman Contact Output	Form-C, 48 Volt max, 100 mA max
Programmable Contact Outputs	2 available, Form-C, 48 V max, 100 mA max
Displays (optional)	1, with 2.03 cm (0.8 in.) high, 3-character, alphanumeric LED display
Operator Interface (optional)	4-line by 20-character backlight LCD alpha-numeric display; 8-key general purpose keyboard
Approximate Shipping Weight	23 kg (50 lbs)

*Available at future date.

- e. **GUI Multipurpose Board** (optional). The GUI multipurpose board, which is part of the GUI assembly, has a 4-line by 20-character liquid crystal display (LCD) and eight membrane keys. All operator-set variables are input using the LCD screen and keyboard.

WARNING

See Safety Data Sheet 1M03296 for safety related information.

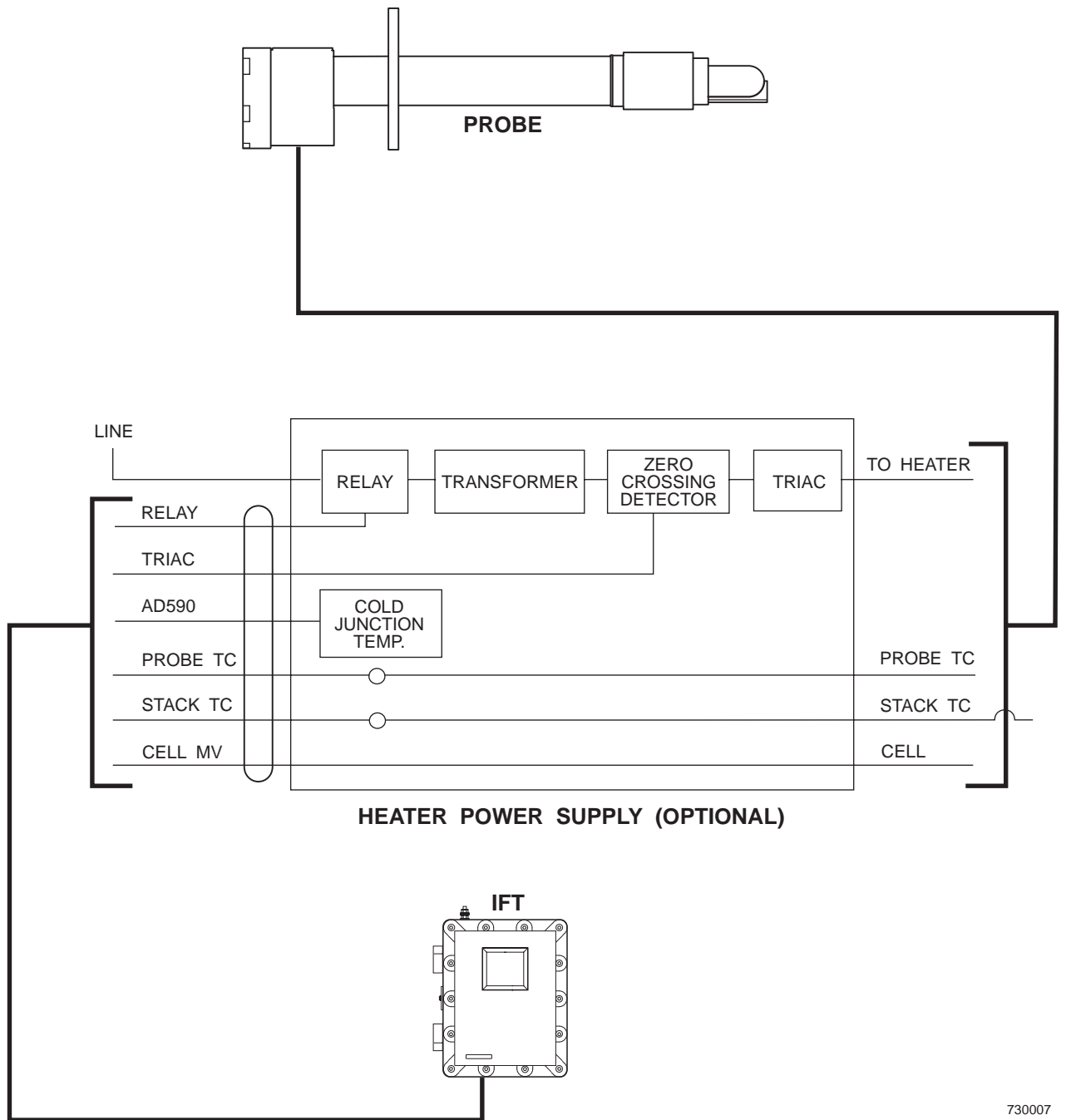
- 1-2. **THEORY OF OPERATION.** A functional block diagram of the IFT, connected to the HPS and probe, is shown in Figure 1-2. In operation, the IFT monitors the temperature of the cell by means of the probe thermocouple. The IFT controls the temperature of the cell.

NOTE

The IFT may also be connected directly to the probe without the use of an HPS. In this instance, the probe heater will be controlled directly at the IFT.

A cold junction temperature compensation feature ensures an accurate probe thermocouple reading. A temperature sensor in the heater power supply monitors the temperature at the junction between the compensated cable running to the probe and the uncompensated cable running to the IFT. The voltage from this sensor is used by the IFT to compensate the probe thermocouple readings for the temperature at the junction.

The cell signal is a voltage proportional to the oxygen concentration difference between the two sides of the cell. The IFT receives this signal and translates it into a user-specified form for display and/or output.



730007

Figure 1-2. System Block Diagram

SECTION II. IFT 3000 TROUBLESHOOTING

WARNING

Consult Safety Data Sheet 1M03296 before performing any work on the CENELEC approved IFT 3000.

WARNING

Install all protective equipment covers and safety ground leads after troubleshooting. Failure to install covers and ground leads could result in serious injury or death.

2-1. **OVERVIEW.** The IFT troubleshooting section describes how to identify and isolate faults which may develop in the IFT.

2-2. **IFT TROUBLESHOOTING.** IFT troubleshooting is achieved by determining the functional status of the microprocessor board and interpreting status displays on the front panel.

a. **Microprocessor Status LED.** The microprocessor board includes an LED to aid in isolating equipment faults. LED indications are as follows:

1. **LED OFF.** IFT failure or power is removed; refer to Troubleshooting Flowchart #1 (Figure 2-1).
2. **LED ON - STEADY.** Heater system failure; refer to Troubleshooting Flowchart #2 (Figure 2-2).

3. **LED ON - FLASHING.** Microprocessor normal.

b. **Equipment Status (LCD) Displays.** The status line of the GUI equipped IFT will display one of the following conditions. To troubleshoot an equipment fault, refer to COMPONENT FAILURE indications applicable to the display message (SYMPTOM) in Table 2-1.

1. OK - The system is operating normally.
2. CAL - The system is currently undergoing calibration.
3. C Err - An error was detected during the calibration process.
4. H Err - There is a fault within the heater system.
5. TGLow - There is no test gas pressure.
6. HiO₂ - The O₂ value is above the high alarm limit.
7. LoO₂ - The O₂ value is below the low alarm limit.
8. R Hi - The cell resistance is above the high limit.
9. Off - The probe has been turned OFF because the IFT cannot control the heater temperature.
10. PRBE - The probe is disconnected, cold, or leads are reversed.

SYMPTOM - MICROPROCESSOR BOARD LED IS OFF

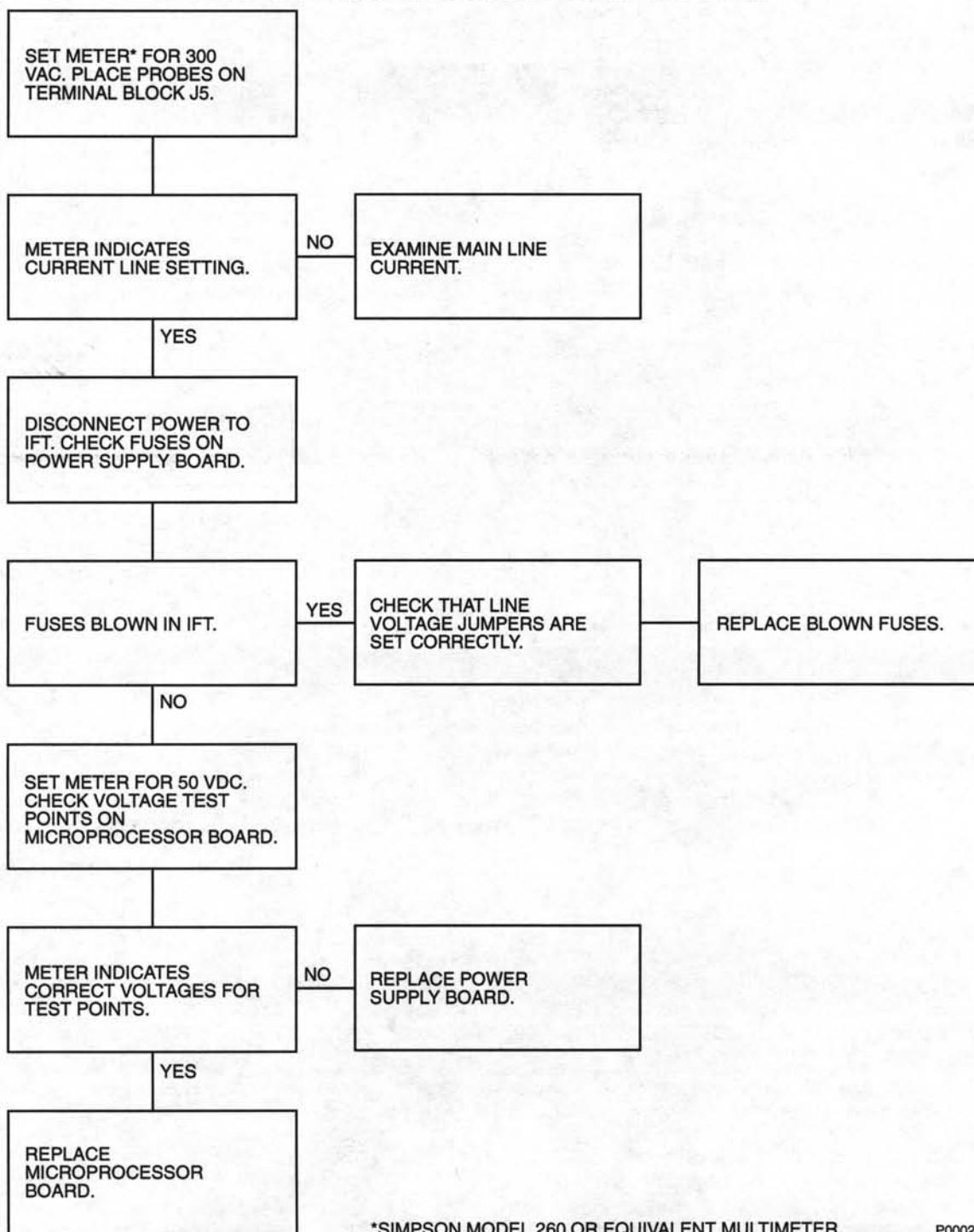
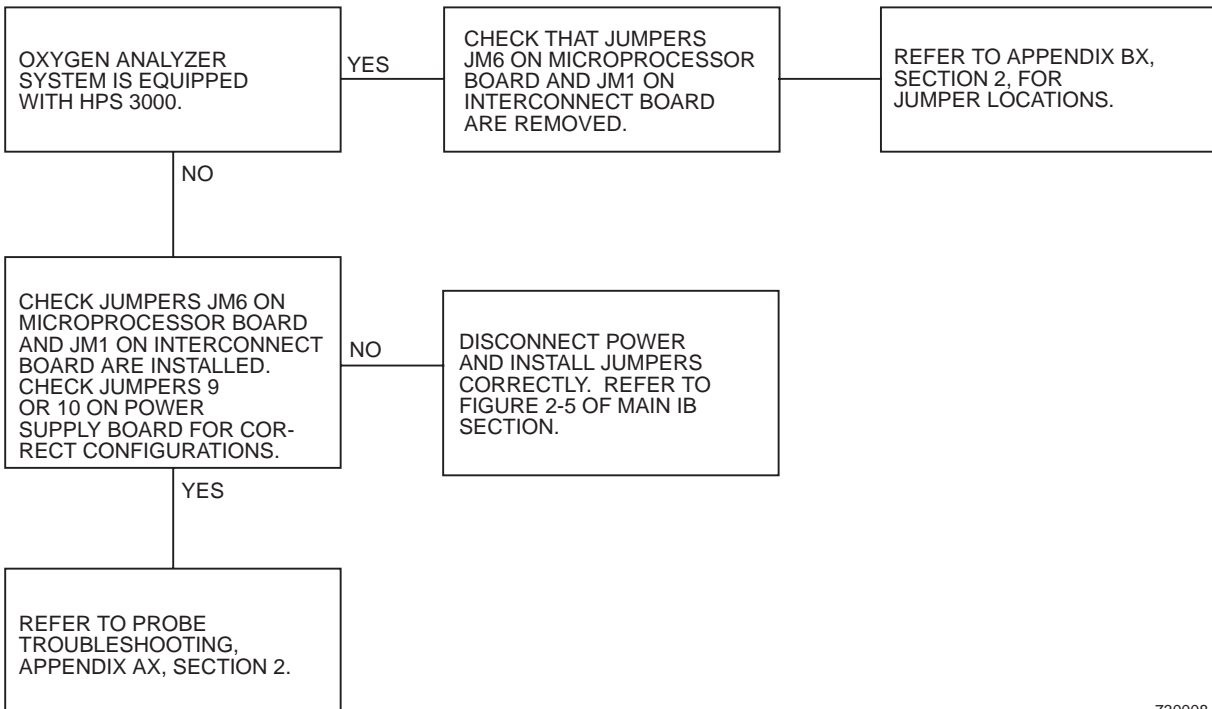


Figure 2-1. IFT Troubleshooting Flowchart, #1

SYMPTOM - MICROPROCESSOR BOARD LED IS STEADY ON

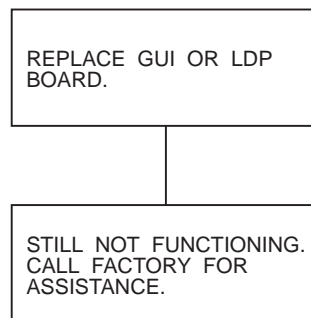


730008

Figure 2-2. IFT Troubleshooting Flowchart, #2

END OF
FLOWCHART
#2

SYMPTOM - GENERAL USER INTERFACE OR LED DISPLAY PANEL NOT FUNCTIONING



730015

Figure 2-3. IFT Troubleshooting Flowchart, #3

Table 2-1. GUI Equipped IFT Fault Finding.

SYMPTOM	COMPONENT FAILURE
1. Display is blank.	Possible failure within IFT. Check LED on microprocessor board.
2. C Err is displayed.	Repeat calibration sequence. If error persists, troubleshoot major components.
3. H Err is displayed.	Ensure jumpers are set correctly on IFT. If system is equipped with HPS refer to Appendix B, Section 2, for additional troubleshooting procedures.
4. TGLow is displayed.	Possible failure within the MPS. Refer to Appendix D, Section 2, for additional troubleshooting procedures.
*5. HiO ₂ is displayed.	Possible failure within the probe. Ensure the high alarm level has been entered correctly. Refer to Appendix A, Section 2, for additional troubleshooting procedures.
*6. LoO ₂ is displayed.	Possible failure within the probe. Ensure the low alarm parameter has been entered correctly. Refer to Appendix A, Section 2, for additional troubleshooting procedures.
7. R Hi is displayed.	Cell resistance has exceeded upper limit. Ensure resistance value has been entered correctly. Refer to Appendix A, Section 2, for additional troubleshooting procedures.
8. Off	The probe has been turned OFF because the IFT cannot control the heater temperature.
9. PRBE	The probe is disconnected, cold, or leads are reversed.

*HiO₂ and LoO₂ can occur in the system without system failure.

SECTION III. SERVICE AND NORMAL MAINTENANCE

WARNING

See Safety Data Sheet 1M03296 for safety related information.

WARNING

Install all protective equipment covers and safety ground leads after equipment repair or service. Failure to install covers and ground leads could result in serious injury or death.

3-1. OVERVIEW. This section describes service and routine maintenance of the Intelligent Field Transmitter. Replacement parts referred to are available from Rosemount. Refer to Section IV for part numbers and ordering information.

3-2. FUSE REPLACEMENT. Power supply board (4, Figure 3-1) contains four identical 5 amp fuses (5 amp anti-surge, Type T to IEC127, Rosemount part number 1L01293H02). Perform the following procedure to check or replace a fuse. In addition, 2 additional 5 amp fuses (F1 and F2) are included if the unit has an internal heater installed.

- a. Follow the Power Down procedure outlined in Safety Data Sheet 1M03296 and the official "codes of practice" for your country of installation.
- b. Open cover door (17) of the IFT by removing securing screws (23).
- c. Open liner assembly front panel (22) of the IFT by turning 1/4 turn fastener (21) counterclockwise.
- d. Unscrew fuse holder top and remove the fuse (5). After checking or replacing a fuse, reinstall the fuse holder top.
- e. Close liner assembly front panel (22) and secure by turning 1/4 turn fastener (21) clockwise.
- f. Close cover door (13) and secure with securing screws (23).

3-3. TRANSFORMER REPLACEMENT.

WARNING

See Safety Data Sheet 1M03296 for safety related information.

- a. Follow the Power Down procedure outlined in Safety Data Sheet 1M03296 and the official "codes of practice" for your country of installation.
- b. Open cover door (17) of the IFT by removing securing screws (23).
- c. Open liner assembly front panel (22) of the IFT by turning 1/4 turn fastener (21) counterclockwise.
- d. Disconnect cable (1) from the receptacle on microprocessor board (16). Disconnect GUI assembly cable or LDP assembly cable from receptacles on microprocessor board if IFT is equipped with GUI or LDP.
- e. Carefully tagging wires, remove the wires from terminal strip on interconnect board (14).
- f. Remove mounting plate (17) by removing four screws (6) and washers (7) from liner assembly (9).
- g. Disconnect transformer cable plugs from the receptacles on power supply board (4).
- h. Remove transformer (10) from the enclosure base (11) by removing four screws (6).
- i. Attach new transformer to the enclosure base (11) with four screws (6).
- j. Connect the transformer cable plugs from transformer (10) to the receptacles on power supply board (4).
- k. Reinstall mounting plate (17) to the liner assembly with four screws (6) and washers (7).
- l. Reinstall the wires to the terminal strip on interconnect board (14) as was noted in step e.

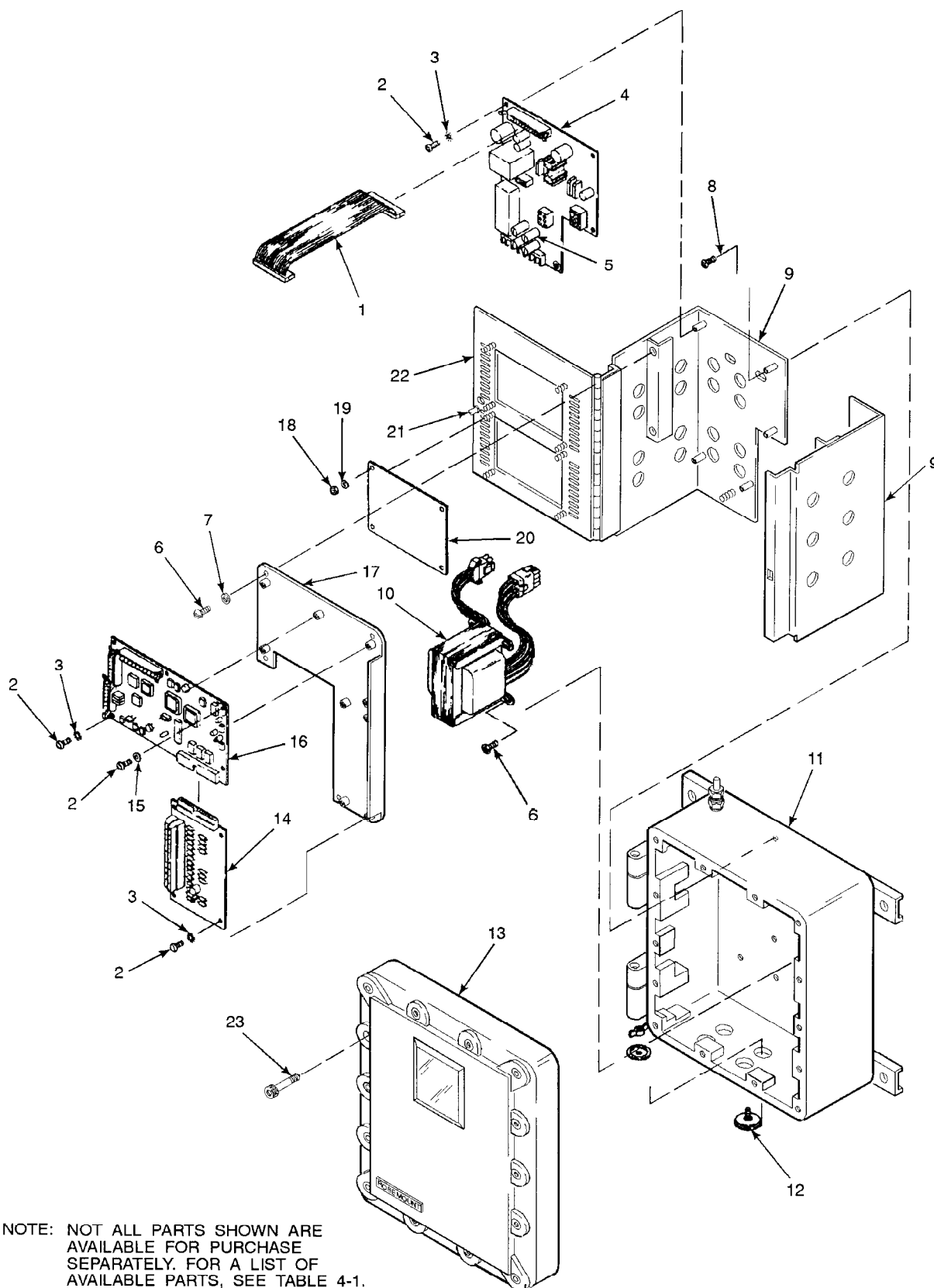


Figure 3-1. Intelligent Field Transmitter, Exploded View

LEGEND FOR FIGURE 3-1

- | | | |
|------------------------------|--------------------------|---------------------------------|
| 1. Cable | 9. Liner Assembly | 17. Mounting Plate |
| 2. Machine Screw, M3 x 8 mm | 10. Transformer | 18. Hex Nut, M3 |
| 3. Lockwasher, 3 mm | 11. Enclosure | 19. Flat Washer, 3 mm |
| 4. Power Supply Board | 12. Plug | 20. Cover Plate |
| 5. Fuses, 5 amp | 13. Cover Door | 21. 1/4 Turn Fastener |
| 6. Machine Screw, M5 x 8 mm | 14. Interconnect Board | 22. Linear Assembly Front Panel |
| 7. Lockwasher, 5 mm | 15. Plastic Washer, 3 mm | 23. Securing Screws |
| 8. Machine Screw, #10 x 0.38 | 16. Microprocessor Board | |

- m. Connect cable (1) to the receptacle on microprocessor board (16). Reconnect GUI assembly cable or LDP assembly cable to receptacles on microprocessor board if IFT is equipped with GUI or LDP.
- n. Close liner assembly front panel (22) and secure by turning 1/4 turn fastener (21) clockwise.
- o. Close cover door (17) and secure with securing screws (23).

3-4. POWER SUPPLY BOARD REPLACEMENT.

WARNING

See Safety Data Sheet 1M03296 for safety related information.

- a. Follow the Power Down procedure outlined in Safety Data Sheet 1M03296 and the official “codes of practice” for your country of installation.
- b. Open cover door (17) of the IFT by removing securing screws (23).
- c. Open liner assembly front panel (22) of the IFT by turning 1/4 turn fastener (21) counterclockwise.
- d. Disconnect cable (1) from the receptacle on microprocessor board (16). Disconnect GUI assembly cable or LDP assembly cable from receptacles on microprocessor board if IFT is equipped with GUI or LDP.
- e. Carefully tagging wires, remove the wires from terminal strip on interconnect board (14).
- f. Remove mounting plate (17) by removing four screws (6) and washers (7) from liner assembly (9).
- g. Disconnect the transformer cable plugs from the receptacles on power supply board (4).
- h. Carefully tagging wires, remove the wires from terminal strips J5 and J6 on power supply board (4).
- i. Remove power supply board (4) from liner assembly (9) by removing five screws (2) and washers (3).
- j. Attach new power supply board (4) to liner assembly (9) with five screws (2) and washers (3).
- k. Reconnect the wires as noted in step h.
- l. Connect the transformer cable plugs from transformer (10) to the receptacles on power supply board (4).
- m. Reinstall mounting plate (17) to liner assembly (9) with four screws (6) and washers (7).
- n. Reconnect the wires to interconnect board (14) as noted in step e.
- o. Connect cable (1) to the receptacle on microprocessor board (16). Reconnect GUI assembly cable or LDP assembly cable to receptacles on microprocessor board if IFT is equipped with GUI or LDP.
- p. Close liner assembly front panel (22) and secure by turning 1/4 turn fastener (21) clockwise.
- q. Close cover door (13) and secure with securing screws (23).

3-5. MICROPROCESSOR BOARD REPLACEMENT.

WARNING

See Safety Data Sheet 1M03296 for safety related information.

- a. Follow the Power Down procedure outlined in Safety Data Sheet 1M03296 and the official "codes of practice" for your country of installation.
- b. Open cover door (13) of the IFT by removing securing screws (23).
- c. Open liner assembly front panel (22) of the IFT by turning 1/4 turn fastener (21) counterclockwise.
- d. Disconnect cable (1) from the receptacle on microprocessor board (16). Disconnect GUI assembly cable or LDP assembly cable from receptacles on microprocessor board if IFT is equipped with GUI or LDP.

CAUTION

Pull up very carefully on the microprocessor board to ensure that none of the pins in the connection between the microprocessor board and interconnect board are damaged.

- e. Remove microprocessor board (16) by removing five screws (2), three washers (3), and two plastic washers (15).
- f. Attach the new microprocessor board to the interconnect board by carefully lining up the pins on the plug.
- g. Attach microprocessor board (16) to mounting plate (17) with five screws (2), three washers (3) and two plastic washers (15). Use the plastic washers on MH2 and MH3 located on the top of the microprocessor board.
- h. Reconnect cable (1) to receptacle on microprocessor board. Reconnect GUI assembly cable or LDP assembly cable to receptacles on

microprocessor board if IFT is equipped with GUI or LDP.

- i. Close liner assembly front panel (22) and secure by turning 1/4 turn fastener (21) clockwise.
- j. Close cover door (13) and secure with securing screws (23).

3-6. INTERCONNECT BOARD REPLACEMENT.

WARNING

See Safety Data Sheet 1M03296 for safety related information.

- a. Follow the Power Down procedure outlined in Safety Data Sheet 1M03296 and the official "codes of practice" for your country of installation.
- b. Open cover door (13) of the IFT by removing securing screws (23).
- c. Open liner assembly front panel (22) of the IFT by turning 1/4 turn fastener (21) counterclockwise.
- d. Carefully tagging wires, remove the wires from terminal strip on interconnect board (14).

CAUTION

Pull down very carefully on the interconnect board to ensure that none of the pins in the connection between the microprocessor board and interconnect board are damaged.

- e. Remove interconnect board (14) by removing four screws (2) and washers (3).
- f. Attach new interconnect board (14) to the microprocessor board by carefully lining up the pins on the plug.
- g. Attach interconnect board (14) to mounting plate (17) with four screws (2) and washers (3).
- h. Reconnect wires to the terminal strip as noted in step b.

- i. Close liner assembly front panel (22) and secure by turning 1/4 turn fastener (21) clockwise.
- j. Close cover door (13) and secure with securing screws (23).

3-7. GUI ASSEMBLY REPLACEMENT. Replacement instructions are provided for GUI and LDP equipped systems. If the system is not equipped with both a GUI and LDP display, refer to Figure 3-2.

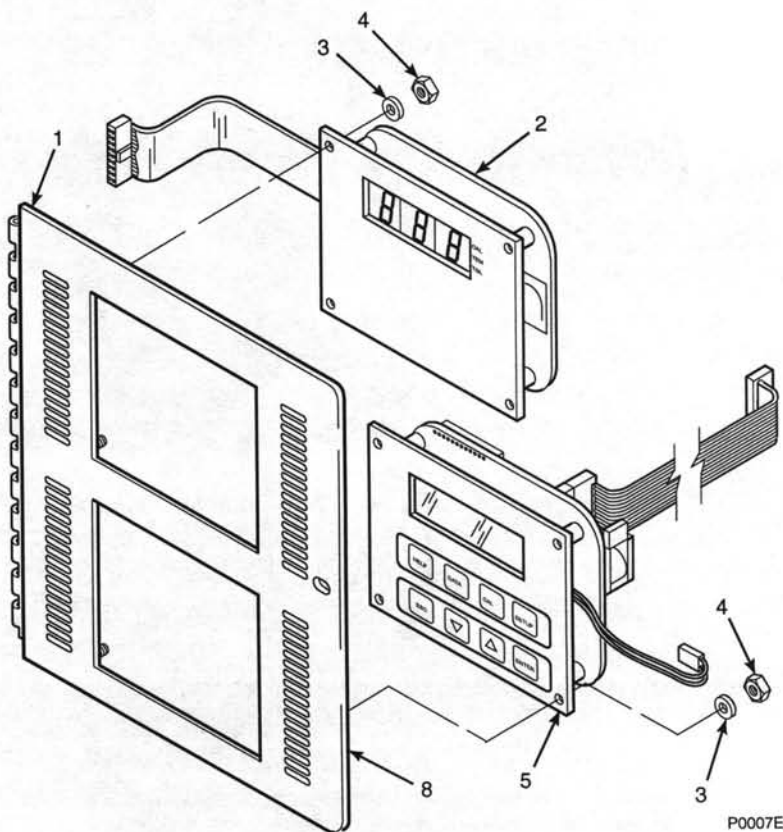
WARNING

See Safety Data Sheet 1M03296 for safety related information.

- a. Follow the Power Down procedure outlined in Safety Data Sheet 1M03296 and the official "codes of practice" for your country of installation.

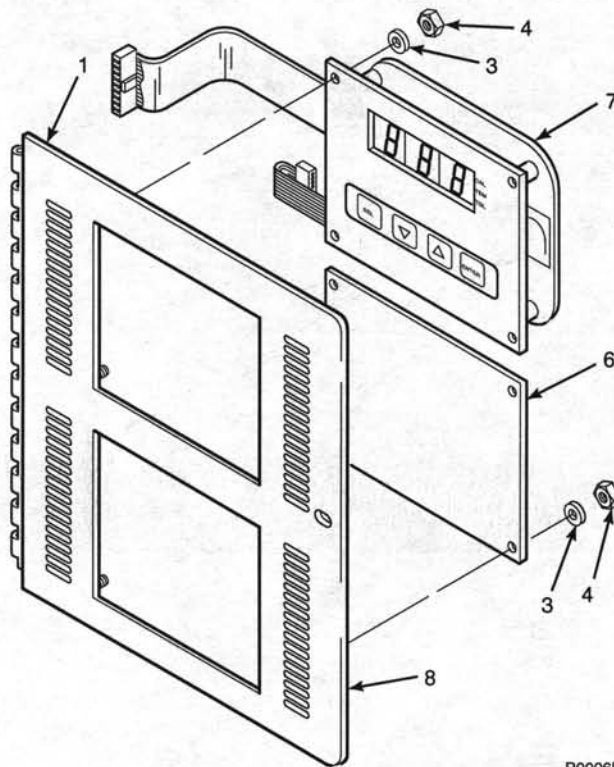
- b. Open cover door (13, Figure 3-1) of the IFT by removing securing screws (23).
- c. Open liner assembly front panel (1, Figure 3-2) of the IFT by turning 1/4 turn fastener (8) counterclockwise.
- d. Disconnect GUI assembly ribbon cable from microprocessor board (16, Figure 3-1).
- e. Remove GUI assembly (5, Figure 3-2) by removing four hex nuts (4) and washers (3).
- f. Attach new GUI assembly with four hex nuts (4) and washers (3).
- g. Reconnect GUI assembly ribbon cable to microprocessor board (16, Figure 3-1).
- h. Close liner assembly front panel (1, Figure 3-2) and secure by turning 1/4 turn fastener (8) clockwise.

- 1. Liner Assembly Front Panel
- 2. LDP Assembly (without keypad)
- 3. Flat Washer 3 mm
- 4. Hex Nut M3
- 5. GUI Assembly
- 6. Cover Plate
- 7. LDP Assembly (with keypad)
- 8. 1/4 Turn Fastener



A. IFT Front Panel with GUI and LDP

Figure 3-2. IFT Front Panel, Exploded View (Sheet 1 of 2)



P0006E

B. IFT Front Panel with LDP

Figure 3-2. IFT Front Panel, Exploded View (Sheet 2 of 2)

- i. Close cover door (13, Figure 3-1) and secure with securing screws (23).
- 3-8. LDP ASSEMBLY REPLACEMENT.** Replacement instructions are provided for GUI and LDP equipped systems. If the system is not equipped with both a GUI and LDP display, refer to Figure 3-2.
- a. Follow the Power Down procedure outlined in Safety Data Sheet 1M03296 and the official "codes of practice" for your country of installation.
 - b. Open cover door (13) of the IFT by removing securing screws (23).
 - c. Open liner assembly front panel (1, Figure 3-2) of the IFT by turning 1/4 turn fastener (8) counterclockwise.
 - d. Disconnect LDP assembly ribbon cable(s) from microprocessor board (16, Figure 3-1).
 - e. Remove LDP assembly (2 or 7, Figure 3-2) by removing four hex nuts (4) and washers (3).
 - f. Attach new LDP assembly with four hex nuts (4) and washers (3).
 - g. Reconnect LDP assembly ribbon cable(s) to microprocessor board (16, Figure 3-1).
 - h. Close liner assembly front panel (1) and secure by turning 1/4 turn fastener (8) clockwise.
 - i. Close cover door (13, Figure 3-1) and secure with securing screws (23).

WARNING

Consult Safety Data Sheet 1M03296 before performing any work on the CENELEC approved IFT 3000.

SECTION IV. REPLACEMENT PARTS

Table 4-1. Replacement Parts for the Intelligent Field Transmitter.

FIGURE and INDEX No.	PART NUMBER	DESCRIPTION
3-1, 10	1N04946G01	Transformer
3-1, 14	3D39120G01	Interconnect Board
3-1, 4	3D39122G01*	Power Supply Board
3-1, 16	3D39118G01	Microprocessor Board
3-2, 5	1N04956G01	GUI Assembly
3-2, 7	1N04959G02	LDP Assembly with keypad
3-2, 2	1N04959G01	LDP Assembly without keypad
3-1, 5	1L01293H02	Fuse, 5A @ 250 Vac, anti-surge, case size; 5 x 20 mm, type T to IEC127, Schurter

*Specify line voltage and probe type when ordering.

NOTE: The replacement parts listed above must be obtained only from the manufacturer or his agent.

APPENDIX JX HART COMMUNICATOR MODEL 275D9E IFT 3000 APPLICATIONS

Instruction Bulletin IB-106-300NX

Rev. 1.0

ROSEMOUNT[®] ANALYTICAL

FISHER-ROSEMOUNT™ Managing The Process Better.™

HIGHLIGHTS OF CHANGES

Effective January, 1997 Rev. 1.0

PAGE	SUMMARY
2-1	Insert warning concerning protective equipment covers and safety ground leads.
4-1	Insert warning concerning protective equipment covers and safety ground leads.

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SECTION I. DESCRIPTION

WARNING

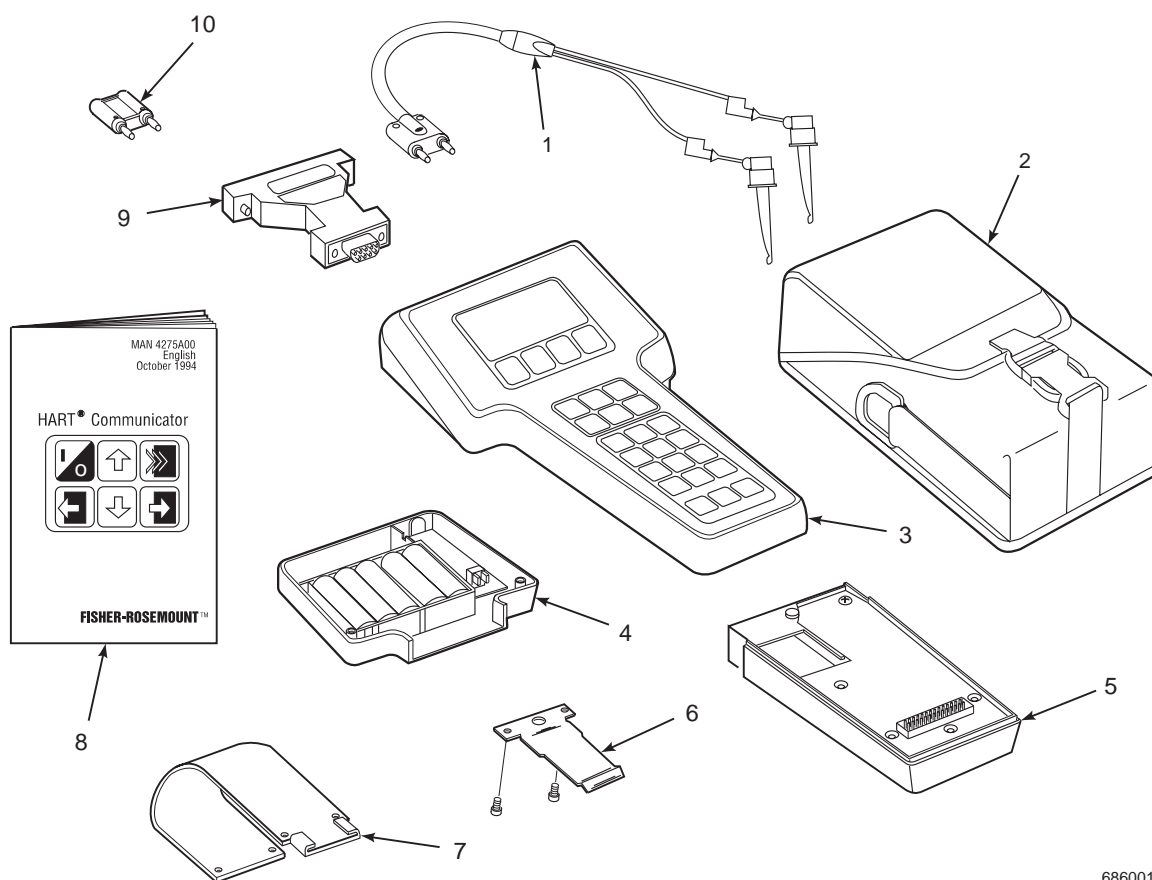
See Safety Data Sheet 1M03296 for safety related information.

rechargeable NiCad battery pack has been selected, at least one spare battery pack (per HART Communicator) is recommended.

1-2. UNIT OVERVIEW.

- 1-1. COMPONENT CHECKLIST OF TYPICAL HART® COMMUNICATOR PACKAGE. A typical Model 275D9E HART® Communicator package should contain the items shown in Figure 1-1, with the possible exception of options. If a

- a. Scope. This Instruction Bulletin supplies details needed to install and operate the HART® Communicator in relation to the World Class 3000 Intelligent Field Transmitter. Information on troubleshooting the communicator is also included.



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ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Lead Set (with Connectors)	6	Belt Clip (with screws)
2	Carrying Case	7	Hanger (mounts on belt clip, Option)
3	Communicator	8	Pocket-sized Instruction Manual
4	AA Alkaline Battery Pack, or Rechargeable NiCad Battery Pack (Option)	9	PC Interface Adaptor (Option)
5	Memory Module	10	Load Resistor, 250 Ω (Option)

Figure 1-1. Typical HART® Communicator Package, Model 275D9E

- b. Device Description.** The HART (Highway Addressable Remote Transducer) Communicator is a hand-held communications interface device. It provides a common communications link to all microprocessor-based instruments which are HART compatible. The hand-held communicator contains an 8 x 21 character liquid crystal display and 25 keys. A pocket-sized manual, included with the HART Communicator, details the specific functions of all keys.

To interface with the IFT 3000, the HART Communicator requires a termination point along the 4-20 mA current loop, and a minimum load resistance of 250 ohms between the communicator and the power supply. The HART Communicator accomplishes its task by use of a frequency shift keying (FSK) technique. With the use of FSK, high-frequency digital communication signals are

superimposed on the 4-20 mA transmitter current loop. The communicator does not disturb the 4-20 mA signal, since no net energy is added to the loop.

The HART Communicator may be interfaced with a personal computer, providing special software has been installed. To connect the HART Communicator to a PC, an interface adaptor is required. Refer to the proper HART Communicator documentation in regard to the PC interface option.

- 1-3. SPECIFICATIONS.** HART Communicator Specifications, Table 1-1, contains physical, functional, and environmental information about the communicator. Use Table 1-1 to ensure the unit is operated in suitable environments, and that the proper battery charging options are used.

Table 1-1. HART Communicator Specifications.

Physical Specifications

Display	8-line liquid crystal display with a line width of 21 characters (128 x 64 pixels)
Keypad	Membrane design with tactile feedback. 25 keys include:
	6 action keys
	4 software-defined function keys
	12 alphanumeric keys
	3 shift keys
Weight	≈ 3 lbs (1.4 kg) including batteries

Functional Specifications

Memory	Nonvolatile memory. Retains memory when the communicator is not powered.
Program (and Device) Descriptions .	1.25 MB
Transmitter Data	2 K
Power Supply	Five AA 1.5 volt batteries. A rechargeable Nickel-Cadmium battery pack is optional.
Battery Charger Options	110/120 Vac, 50/60 Hz, U.S. plug 220/230 Vac, 50 Hz, European plug 220/230 Vac, 50 Hz, UK plug
Microprocessors	32-bit Motorola type 68331 8-bit Motorola type 68HC05
Connections	Lead set: Two 4 mm banana plugs Battery charger: 2.5 mm jack Serial port: PC connection through optional adaptor Memory Module: 26 pin, 0.1 inch Berg connector

Environmental Specifications

Operating Limits	32° to 122°F (0° to 50°C)
Storage Limits	-4° to 158°F (-20° to 70°C)
Humidity	0 to 95% relative humidity under non-condensing conditions below 104°F (40°C) without error
Hazardous Locations	CENELEC - Intrinsic Safety Certification
Certifications	Factory Mutual (FM) - Intrinsic Safety Approval Canadian Standards Association (CSA) - Intrinsic Safety Approval

SECTION II. INSTALLATION

WARNING

Consult Safety Data Sheet 1M03296 before performing any work on the CENELEC approved IFT 3000.

WARNING

Install all protective equipment covers and safety ground leads after installation. Failure to install covers and ground leads could result in serious injury or death.

2-1. HART COMMUNICATOR SIGNAL LINE CONNECTIONS.

The HART Communicator can connect to the IFT analog output signal line at any wiring termination point in the 4-20 mA current loop. There are two methods of connecting the HART Communicator to the signal line. For applications in which the signal line has a load resistance of 250 ohms or more, refer to method 1. For applications in which the signal line load resistance is less than 250 ohms, refer to method 2.

a. Method 1, For Load Resistance > 250 Ohms.

Refer to Figure 2-1 and the following steps to connect the HART Communicator to a signal line with 250 ohms or more of load resistance.

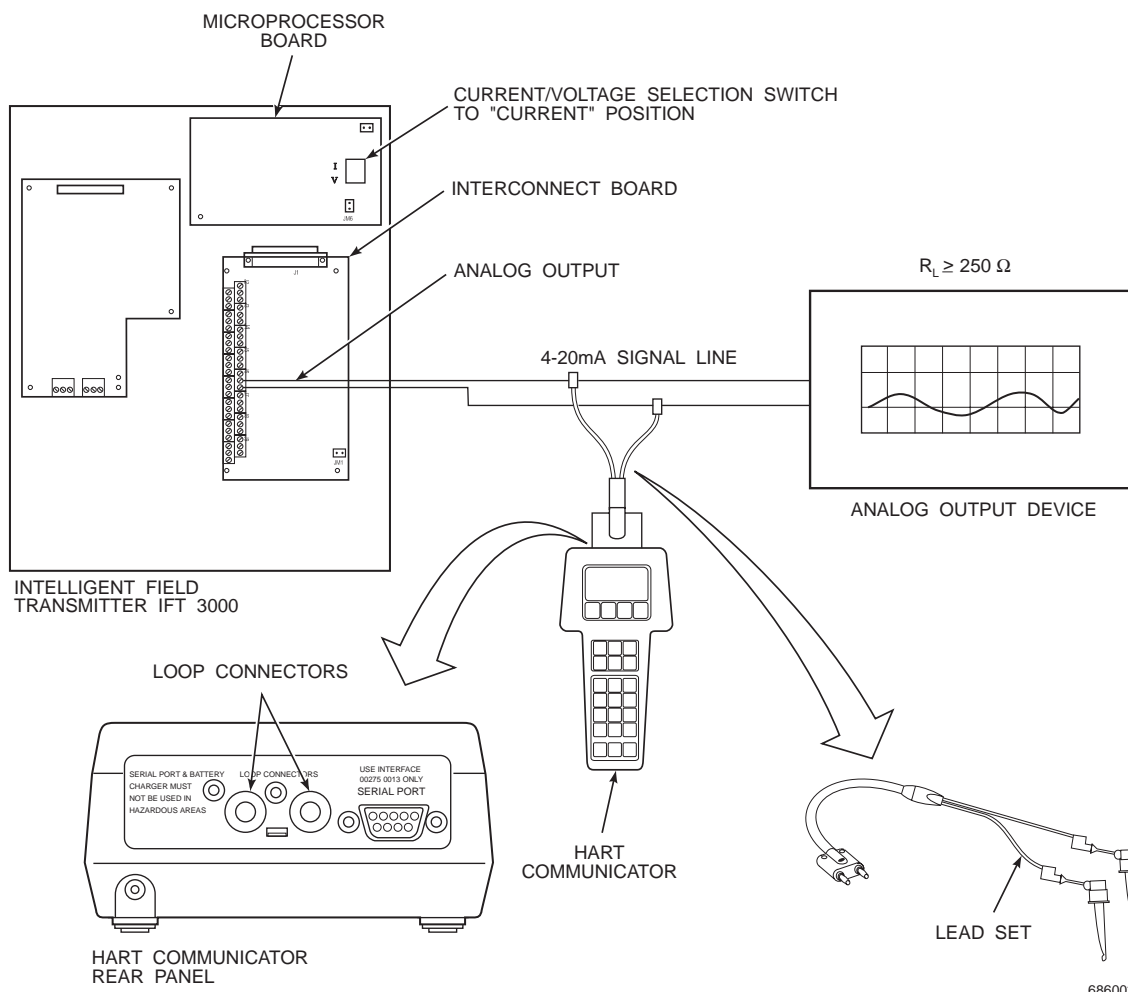


Figure 2-1. Signal Line Connections, ≥ 250 Ohms Load Resistance

WARNING

Consult Safety Data Sheet 1M03296 before performing any work on the CENELEC approved IFT 3000.

WARNING

Consult Safety Data Sheet 1M03296 before performing any work on the CENELEC approved IFT 3000.

WARNING

HART connections must be made outside of the hazardous area. Because the HART option is not protected by energy limiting barriers, it must not be interfaced from within a hazardous area. The signal cables should be routed outside the hazardous area and the connections made external to the hazardous area.

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WARNING

Explosions can result in death or serious injury. Do not make connections to the HART Communicator's serial port or NiCad recharger jack in an explosive atmosphere.

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1. Program IFT analog output to 4-20 mA. Select the current mode using the current/voltage selector switch on the microprocessor board in the IFT.
 2. Using the supplied lead set, connect the HART Communicator in parallel to the IFT 3000. Use any wiring termination points in the analog output 4-20 mA signal line.
- b. **Method 2, For Load Resistance < 250 Ohms.**
Refer to Figure 2-2 and the following steps to connect the HART Communicator to a signal line with less than 250 ohms load resistance.-

1. Program IFT analog output to 4-20 mA. Select the current mode using the current/voltage selector switch on the microprocessor board in the IFT.
2. At a convenient point, break the analog output 4-20 mA signal line and install the optional 250 ohm load resistor.
3. Plug the load resistor into the loop connectors (located on the rear panel of the HART Communicator).

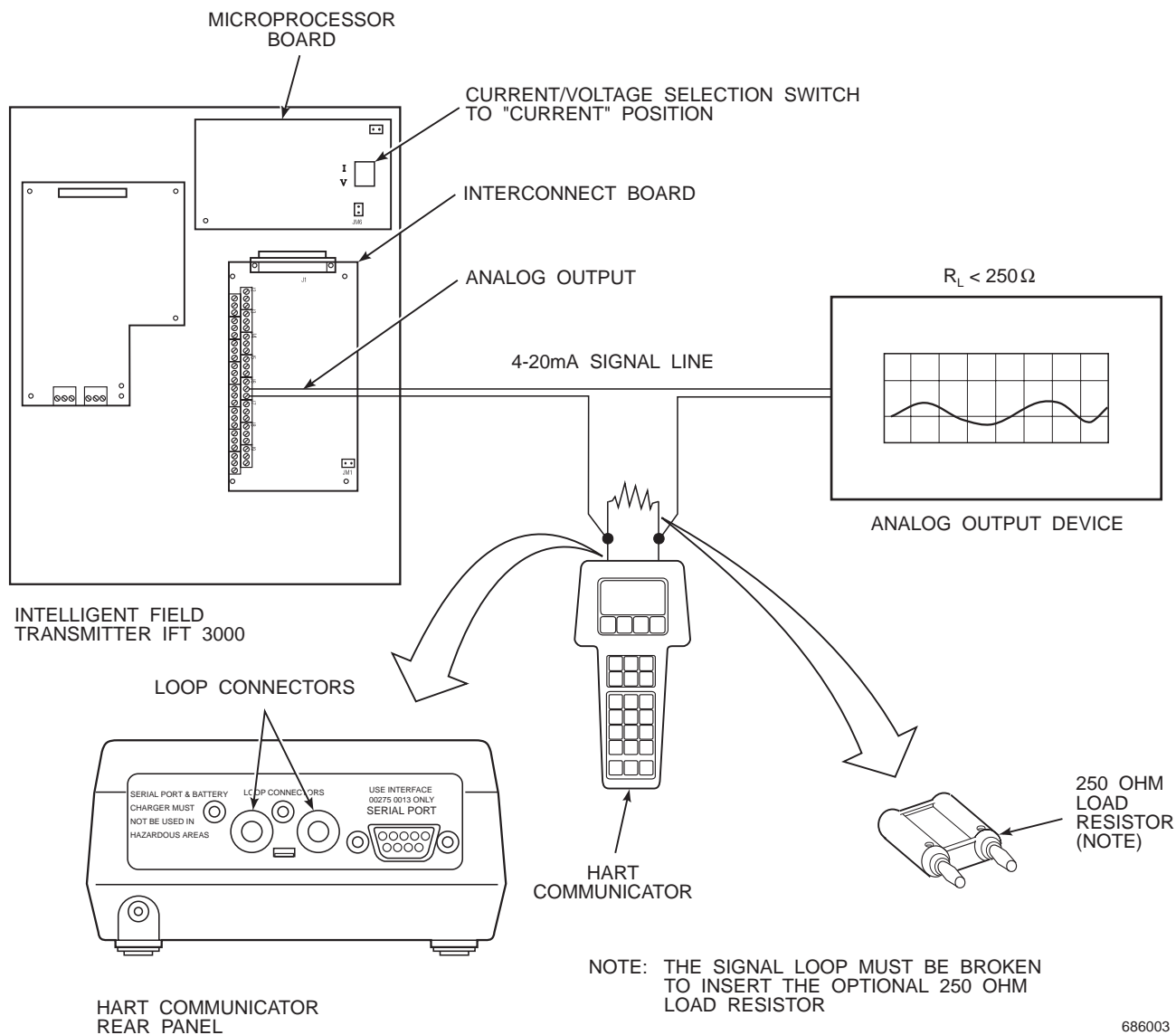


Figure 2-2. Signal Line Connections, <250 Ohms Load Resistance

2-2. HART COMMUNICATOR PC CONNECTIONS. There is an option to interface the HART Communicator with a personal computer. Load the designated Cornerstone® software into the PC. Then, link the HART Communicator to the PC using the

interface PC adaptor which connects to the serial port (on the communicator rear panel).

Refer to the proper HART Communicator documentation in regard to the PC interface option.

SECTION III. OPERATION

WARNING

See Safety Data Sheet 1M03296 for safety related information.

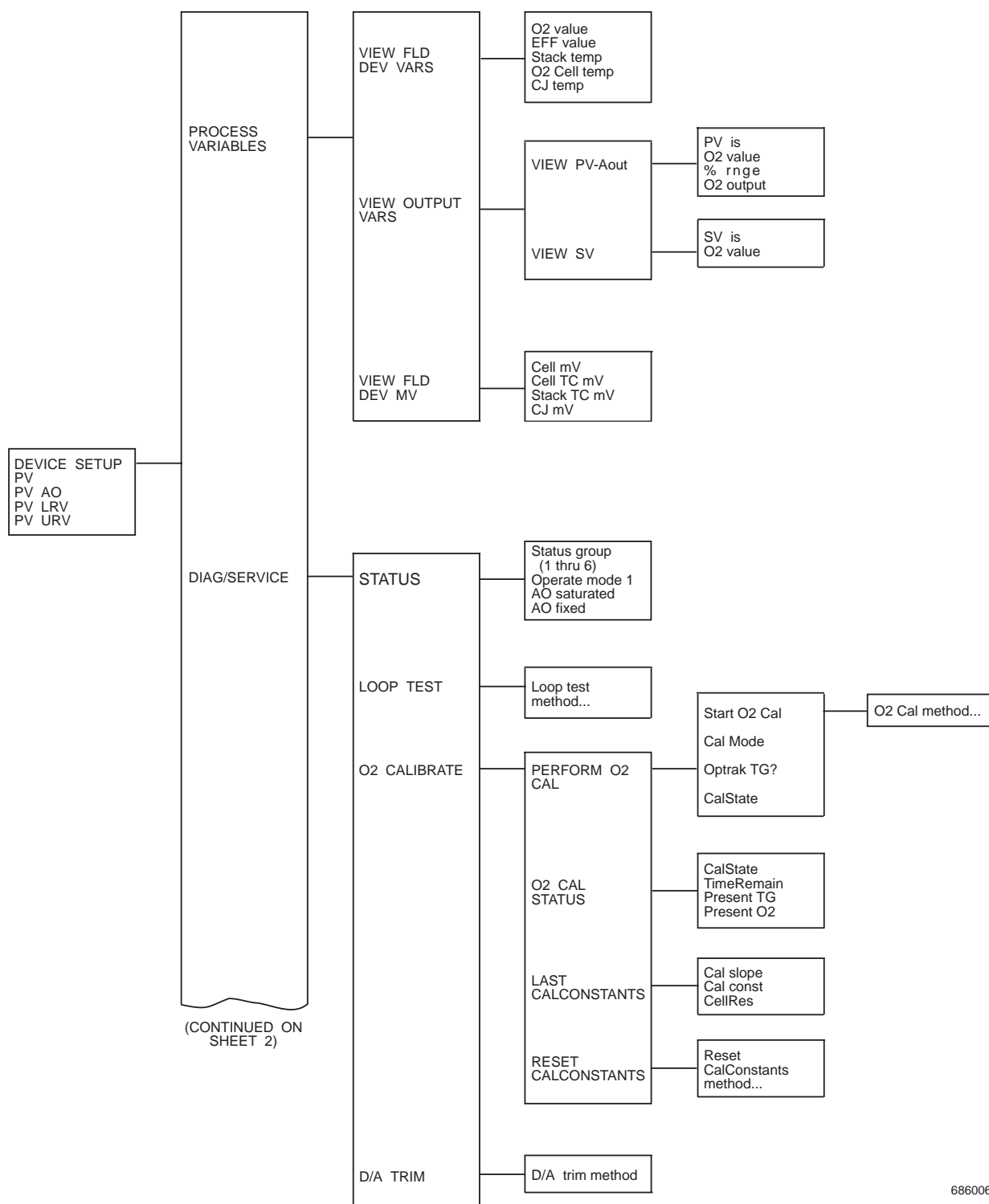
- 3-1. **OFF-LINE AND ON-LINE OPERATIONS.** The HART Communicator can be operated both off-line and on-line. Off-line operations are those in which the communicator is not connected to the IFT system. Off-line operations can include interfacing the HART Communicator with a PC (refer to applicable HART Documentation regarding HART/PC applications).

In the on-line mode, the communicator is connected to the 4-20 mA analog output signal line. The

communicator is connected in parallel to the IFT, or in parallel to the 250 ohm load resistor.

The opening menu (displayed on the LCD) is different for on-line and off-line operations. When powering up a disconnected (off-line) communicator, the LCD will display the Main Menu. When powering up a connected (on-line) communicator, the LCD will display the On-line Menu. Refer to the HART Communicator manual for detailed menu information.

- 3-2. **MENU TREE FOR HART COMMUNICATOR/
WORLD CLASS 3000 IFT APPLICATIONS.** This section consists of a menu tree for the HART Communicator. This menu is specific to IFT 3000 applications.



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Figure 3-1. Menu Tree for IFT 3000 Application (Sheet 1 of 3)

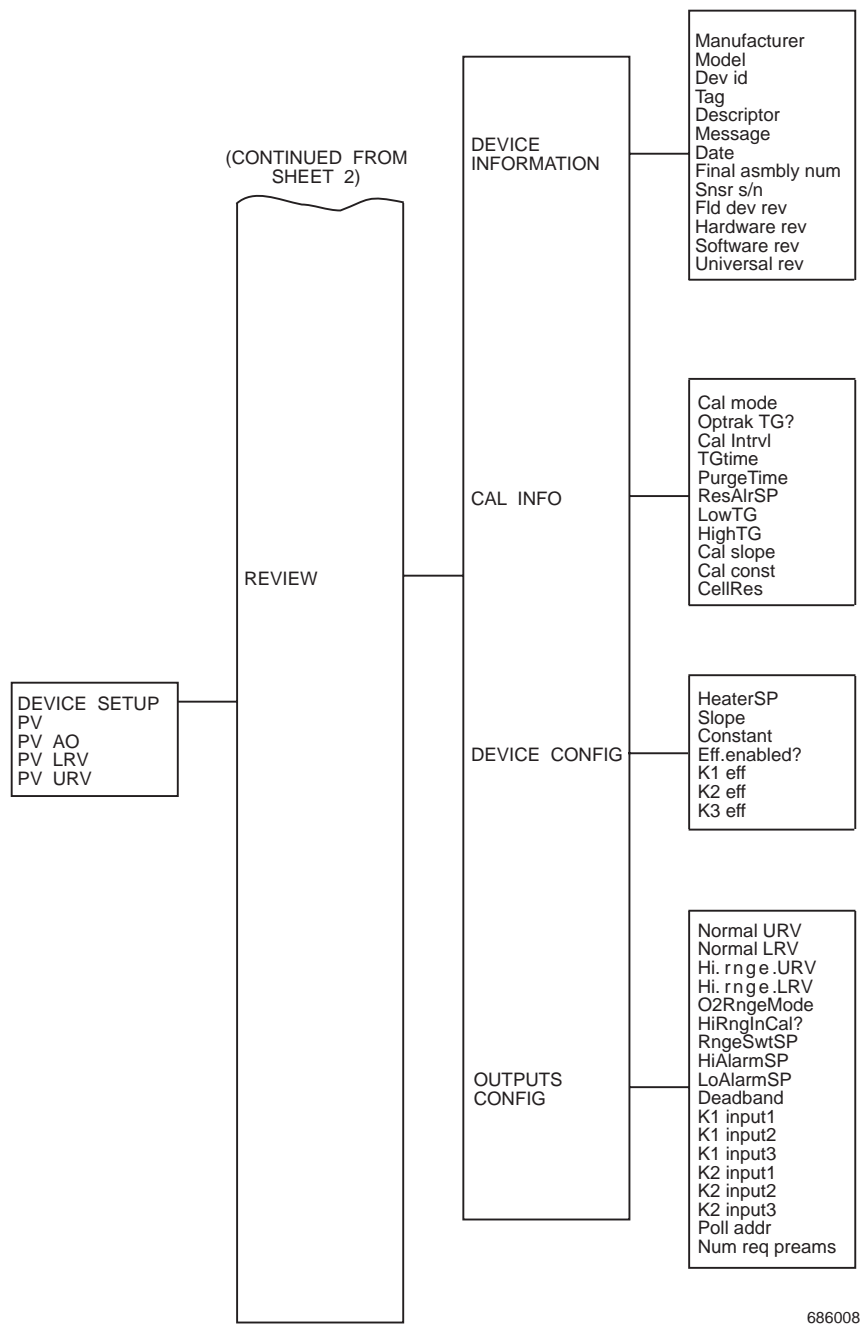


Figure 3-1. Menu Tree for IFT 3000 Applications (Sheet 3 of 3)

SECTION IV. TROUBLESHOOTING

WARNING

Consult Safety Data Sheet 1M03296 before performing any work on the CENELEC approved IFT 3000.

WARNING

Install all protective equipment covers and safety ground leads after troubleshooting. Failure to install covers and ground leads could result in serious injury or death.

4-1. **OVERVIEW.** If the HART Communicator fails to function properly, verify that the unit's battery pack and memory module are correctly assembled to the communicator. Check the communicator's model number. For IFT applications, HART Communicator model number 275D9E must be used. If the HART Communicator model number is correct, and if it is properly assembled, the troubleshooting flowchart, Figure 4-1, may be useful to find and correct problems.

4-2. **TROUBLESHOOTING FLOWCHART.**

Refer to Figure 4-1.

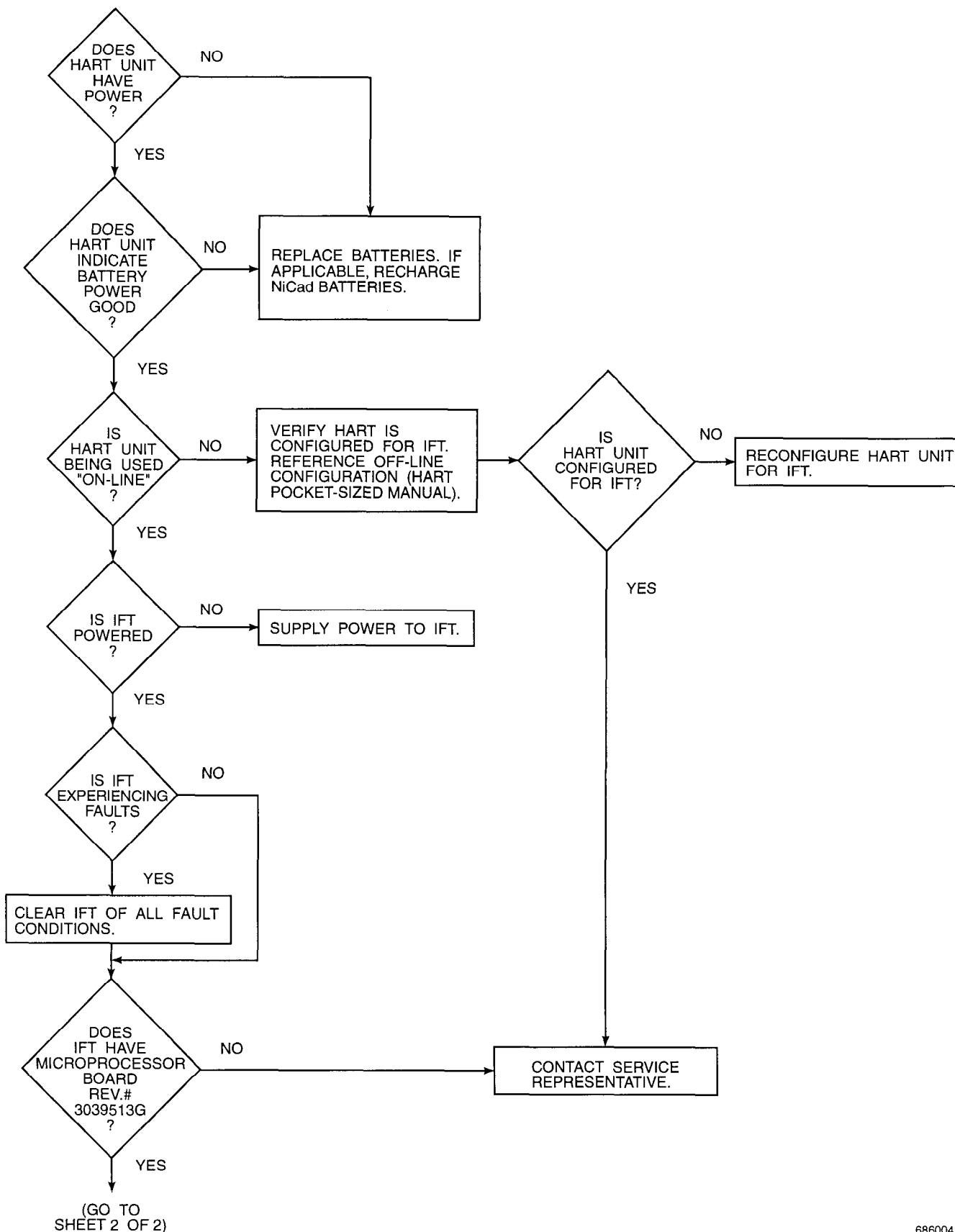
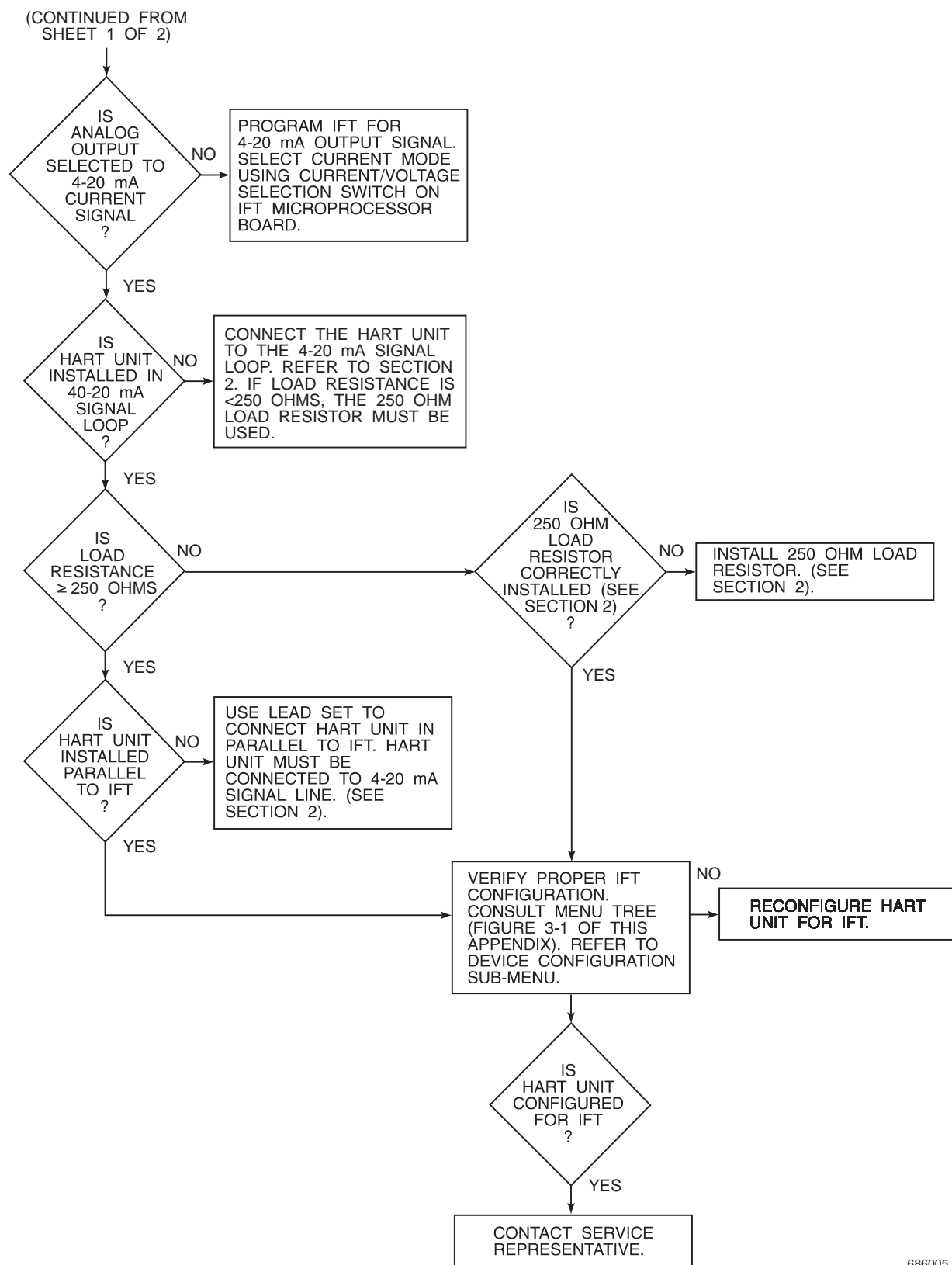


Figure 4-1. Model Number 275D9E, Troubleshooting Flowchart (Sheet 1 of 2)



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Figure 4-1. Model Number 275D9E, Troubleshooting Flowchart (Sheet 1 of 2)

SECTION V. RETURNING EQUIPMENT TO THE FACTORY

5-1. If factory repair of defective equipment is required, proceed as follows:

- a.** Secure a return authorization number from a Rosemount Analytical Sales Office or Representative before returning the equipment. Equipment must be returned with complete identification in accordance with Rosemount instructions or it will not be accepted.

In no event will Rosemount be responsible for equipment without proper authorization and identification.

- b.** Carefully pack defective unit in a sturdy box with sufficient shock absorbing material to insure that no additional damage will occur during shipping.
- c.** In a cover letter, describe completely:
 - 1. The symptoms from which it was determined that the equipment is faulty.
 - 2. The environment in which the equipment has been operating (housing, weather, vibration, dust, etc.).
 - 3. Site from which equipment was removed.
 - 4. Whether warranty service or non-warranty service is requested.
 - 5. Complete shipping instructions for return of equipment.
 - 6. Reference the return authorization number.

- d.** Enclose a cover letter and purchase order and ship the defective equipment according to instructions provided in Rosemount Return Authorization, prepaid, to:

American

Rosemount Analytical Inc.
RMR Department
1201 N. Main Street
Orrville, Ohio 44667

European

Rosemount Ireland
Equipment Return Repair Dept.
Site 7 Shannon Industrial Estate
Co. Clare
Ireland

If warranty service is requested, the defective unit will be carefully inspected and tested at the factory. If failure was due to conditions listed in the standard Rosemount warranty, the defective unit will be repaired or replaced at Rosemount's option, and an operating unit will be returned to the customer in accordance with shipping instructions furnished in the cover letter.

For equipment no longer under warranty, the equipment will be repaired at the factory and returned as directed by the purchase order and shipping instructions.